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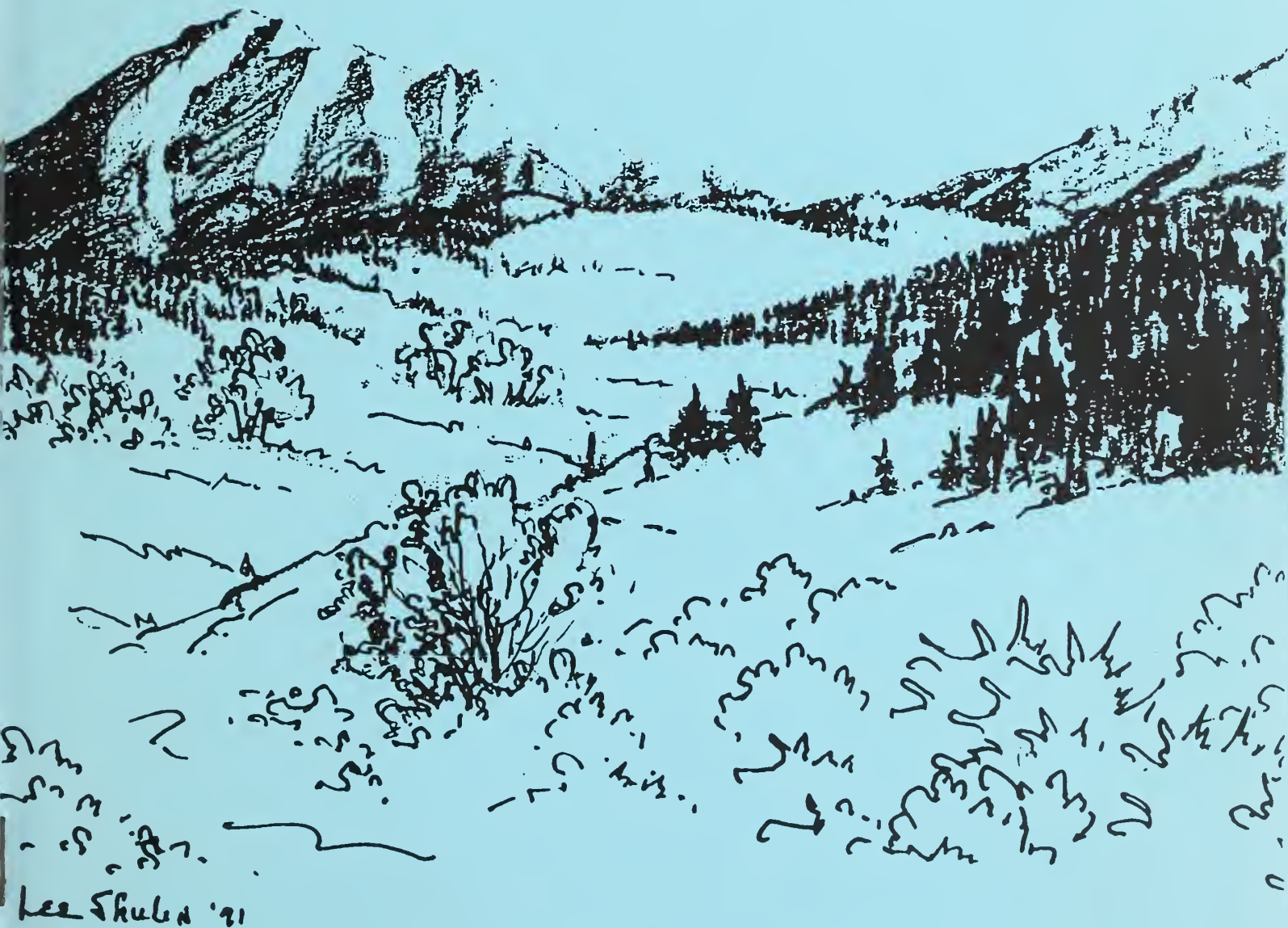
Soil  
Conservation  
Service

Lakewood  
Colorado



# TRINIDAD LAKE NORTH WATERSHED PLAN/EA

LAS ANIMAS COUNTY, COLORADO



Lee Shulen '91

MARCH 1992

04 JUN 1992



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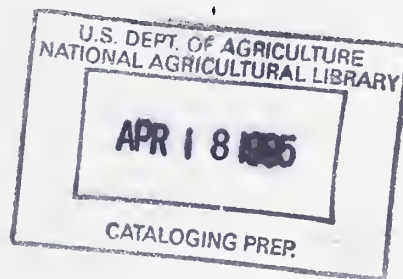
# TRINIDAD LAKE NORTH WATERSHED

LAS ANIMAS, COLORADO

## WATERSHED PLAN AND ENVIRONMENTAL ASSESSMENT

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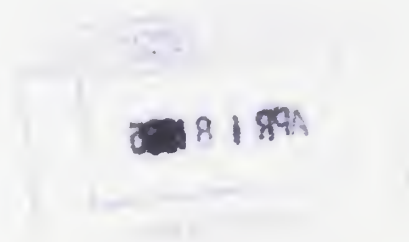
Spanish Peaks Soil Conservation District  
Purgatoire River Soil Conservation District  
Purgatoire River Water Conservancy District  
Las Animas County  
City of Trinidad  
Colorado State Soil Conservation Board



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Soil Conservation Service  
Lakewood, Colorado

March 1992





Trinidad Lake North Watershed  
Plan/Environmental Assessment  
Las Animas County, Colorado

Lead Agency

U.S. Department of Agriculture, Soil Conservation Service

State and Counties Directly Affected

Colorado

Las Animas County

**Abstract**

Trinidad Lake North Watershed Draft Plan/Environmental Assessment

The Document describes the formulation, implementation, and effects of a local-federal, cost-shared project to solve problems related to erosion in the Trinidad Lake North Watershed. Damages include sediment and water quality problems in Trinidad Lake, as well as sediment and erosion damages to rangeland, woodland, and roads. Various enduring and management practice treatment alternatives were investigated, including a no-action alternative. The recommended plan calls for implementation of an accelerated resource management program including the necessary enduring and management practices. This will reduce the amount of soil movement in the watershed due to water erosion. The net effect will be a reduction from 166 to 62 acre feet per year in the amount of sediment reaching Trinidad Lake. As a result, fewer heavy metals will enter Trinidad Lake. Approximately 58,000 acres of various land uses will be protected with the project. The total cost of the project is \$1,528,400, including \$1,168,900 PL-566 funds and \$359,500 local funds. The average annual benefits are \$211,400 and the total average annual cost is \$181,900 with a benefit/cost ratio of 1.16:1.0.

Copies of this Plan/Environmental Assessment can be obtained from:

State Conservationist  
USDA - Soil Conservation Service  
655 Parfet Street, Room E200C  
Lakewood, CO 80215-5517  
Telephone: (303) 236-2886

## WATERSHED AGREEMENT

between the

Spanish Peaks Soil Conservation District

Purgatoire River Soil Conservation District

Purgatoire River Conservancy District

Las Animas County

City of Trinidad

Colorado State Soil Conservation Board

State of Colorado

and the

Soil Conservation Service

United States Department of Agriculture

(Referred to herein as SCS)

Whereas, application has heretofore been made to the Secretary of Agriculture by sponsors for assistance in preparing a plan for works of improvement for the Trinidad Lake North Watershed, State of Colorado, under the authority of the Watershed Protection and Flood Prevention Act (16 U.S.C. 1001-1008); and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended, has been assigned by the Secretary of Agriculture to SCS; and

Whereas, there has been developed through the cooperative efforts of the sponsors and SCS this plan for works of improvement for the Trinidad Lake North Watershed, State of Colorado, hereinafter referred to as the Watershed Plan-Environmental Assessment, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Secretary of Agriculture, through SCS, and the sponsors hereby agree on this plan and that the works of improvement for this project will be installed, operated, and maintained in accordance with the terms, conditions, and stipulations provided for in this watershed plan and including the following:

1. Cost-sharing rate for the establishment of enduring land treatment practices is 65 percent of the actual cost of installing the enduring practices in the selected plan for the



evaluation unit. The estimated total financial assistance cost for enduring practices is \$656,500.

<u>Enduring Practice</u>	<u>Cost-share Rate</u>	<u>Financial Assistance</u>
	(%)	(\$)
Sediment Basin	69	363,300
Diversions	69	16,900
Stockwater Developments	50	33,000
Fencing	50	21,400
Grade Stabilization Structures	69	17,200
Pipeline	50	24,800
Range Seeding	50	10,100
Critical Area Planting	69	155,000
Brush Management	50	1,800
Pasture & Hayland Planting	50	13,000

Cost-sharing for management practices in the selected plan is limited to a one-time incentive payment (not to exceed \$10,000 per individual) of \$1 to \$2 per acre for deferred grazing for a total estimated financial assistance cost of \$70,400.

2. The SCS will assist the sponsors in providing technical assistance to landowners or operators to plan and install land treatment practices shown in the plan. Percentages of technical assistance costs to be borne by the sponsors and SCS are as follows:

<u>Works of Improvement</u>	<u>Sponsors</u>	<u>SCS</u>	<u>Estimated Technical Assistance Cost</u>
	(percent)	(percent)	(dollars)
Land Treatment Practices	0	100	\$397,800

3. The sponsors will obtain applications from owners of not less than 60 percent of the land in the problem area, indicating that they will carry out the planned land treatment measures. Applications will be obtained before the first long-term land treatment contract is executed.

4. The sponsors will obtain agreement with landowners or operators to operate and maintain the land treatment practices for the protection and improvement of the watershed.

5. The sponsors and SCS will each bear the cost of project administration that each incurs, estimated to be \$6,000 and \$44,200 respectively.

6. The costs shown in this plan are preliminary estimates. Final costs to be borne by the parties hereto, will be the actual costs incurred in the installation of works of improvement.

7. This agreement is not a fund-obligating document. Financial and other assistance to be furnished by SCS in carrying out the plan is contingent upon the fulfillment of applicable laws and regulations and the availability of appropriations for this purpose.

8. A separate agreement will be entered into between SCS and sponsors before either party initiates work involving funds of the other party. Such agreements will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.

9. This plan may be amended or revised only by mutual agreement of the parties hereto, except that SCS may deauthorize or terminate funding at any time it determines that the sponsors have failed to comply with the conditions of this agreement. In this case, SCS shall promptly notify the sponsors in writing of the determination and the reasons for the deauthorization of project funding, together with the effective date. Payments made to the sponsor or recoveries by SCS shall be in accord with the legal rights and liabilities of the parties when project funding has been deauthorized. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between SCS and the sponsor(s) having specific responsibilities for the measure involved.

10. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this plan, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

11. The program conducted will be in compliance with all requirements respecting nondiscrimination, as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15), which provide that no person in the United States shall, on the grounds of race, color, national origin, religion, sex, age, marital status, or handicap, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity conducted or assisted by the U.S. Department of Agriculture.

12. The sponsors will insure that each grantee certify that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant.

Spanish Peaks  
Soil Conservation District  
Gulnare, CO 81042

By: James G. Healey  
James G. Healey  
Title: President

Date: 3/23/92

The signing of this plan was authorized by a resolution of the governing body of the Spanish Peaks Soil Conservation District and adopted at a meeting held March 3, 1992.

Warren S. McDonald  
Warren McDonald, Secretary

Date: 3/23/92

Spanish Peaks  
Soil Conservation District  
c/o Soil Conservation Service  
422 East First Street  
Trinidad, CO 81082

-----  
Purgatoire River  
Soil Conservation District  
422 East First Street  
Trinidad, CO 81082

By: Stanley Barron Jr.  
Stanley Barron  
Title: President  
Date: 3/23/92

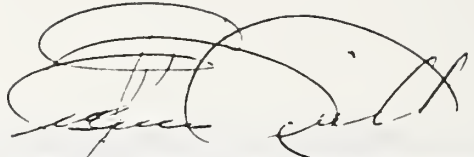
The signing of this plan was authorized by a resolution of the governing body of the Purgatoire River Soil Conservation District and adopted at a meeting held March 2, 1992.

Thomas F. Miller  
Thomas F. Miller, Secretary

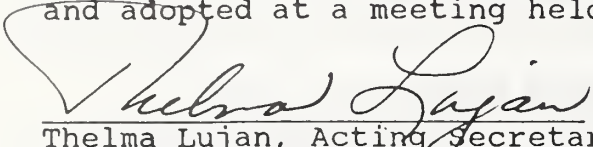
Date: 3/23/92

Purgatoire River  
Soil Conservation District  
422 East First Street  
Trinidad, CO 81082

Purgatoire River  
Water Conservancy District  
314 West Main Street  
Trinidad, CO 81082

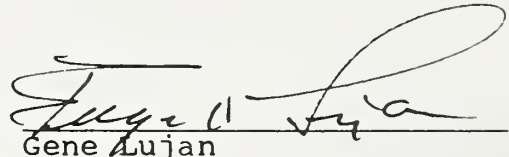
By:   
Eugene Aiello  
Title: President  
Date: 3/23/92

The signing of this plan was authorized by a resolution of the governing body of the Purgatoire River Water Conservancy District and adopted at a meeting held March 5, 1992.

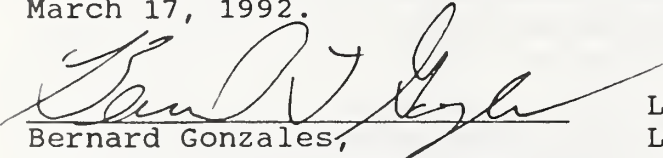
  
Thelma Lujan, Acting Secretary  
Date: 3-23-92

Purgatoire River  
Water Conservancy District  
314 West Main Street  
Trinidad, CO 81082

-----  
Las Animas County  
Las Animas County Courthouse  
Trinidad, CO 81082

By:   
Gene Lujan  
Title: Chairman  
Date: 3/23/92

The signing of this plan was authorized by a resolution of the governing body of Las Animas County and adopted at a meeting held March 17, 1992.

  
Bernard Gonzales,  
County Clerk and Recorder

Las Animas County  
Las Animas County Courthouse  
Trinidad, CO 81082

Date: March 23-1992



City of Trinidad  
City Hall  
Trinidad, CO 81082

By:

Beatrice Kłodzinski  
Beatrice Kłodzinski

Title: Mayor

Date: 3/23/92

The signing of this plan was authorized by a resolution of the governing body of the City of Trinidad and adopted at a meeting held March 3, 1992.

Lidia Shea  
Lidia Shea, City Clerk

Date: 3/23/92

City of Trinidad  
City Hall  
Trinidad, CO 81082

Colorado State  
Soil Conservation Board  
214 State Centennial Building  
1313 Sherman Street  
Denver, CO 80203

By:

Ran Severin

Title: \_\_\_\_\_

Date: 3/23/92

The signing of this plan was authorized by resolution of the Colorado State Soil Conservation Board and adopted at a meeting held on February 21, 1992.

Dan Parker  
Dan Parker, Director

Date: 3/23/92

Colorado State  
Soil Conservation Board  
219 State Centennial Building  
1313 Sherman Street  
Denver, CO 80203

United States  
Department of Agriculture  
Soil Conservation Service  
655 Parfet Street, Rm. E200C  
Lakewood, CO 80215-5517

Approved by:

Duane L. Johnson  
Duane L. Johnson

Title: State Conservationist

Date: 3/23/92

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## SUMMARY OF WATERSHED PLAN-EA

**Project:** Trinidad Lake North Watershed      **County:** Las Animas

**State:** Colorado

**Names of Sponsors:**

Spanish Peaks Soil Conservation District  
Purgatoire River Soil Conservation District  
Purgatoire River Conservancy District  
Las Animas County  
City of Trinidad  
Colorado State Soil Conservation Board

**Description of Recommended Plan:**

Alternative three is the Recommended Plan. The plan is composed of management and enduring conservation practices. A combination of management and enduring conservation measures are utilized in this alternative. Structures to control gully erosion dominate the enduring type practices. Planned Grazing Systems dominate the management type practices.

An educational component in the plan coincides with the Planned Grazing System aspect of the plan. This component will be developed by the sponsors.

**Resource Information:**

Watershed Size: 111,100 Ac.

Land Use:	Rangeland	61,800 Ac.
	Woodland	12,800 Ac.
	Irr. Pasture & Hayland	600 Ac.
	Dry Pasture & Hayland	700 Ac.
	Wildlife land	6,700 Ac.
	* Other land	28,500 Ac.

\* "Other land" consists of roads and subdivisions.

Land ownership: Private (92.5%)  
State (7%)  
Federal (.5%)

Number of Farms: 114 ranch units  
Average Farm Size: 542 Ac.  
Prime and Important Farmland: none  
Minority Agricultural Producers exceed (45%)  
Limited Resource Farmers (25%)

## Project Beneficiary Profile:

The economy of the watershed is based on agriculture (ranching). The 1989 per capita income for Las Animas County residents was \$12,216, whereas the Colorado per capita income was \$17,504 for the same period. The population within the watershed is 45% Hispanic, with an average age of 32. The average age of a Colorado resident is 29. The January to April 1991 unemployment rate was 9.4% which compares with 5.9% for Colorado. Numerous subdivisions have been and are being built within the watershed. There are seasonally used homes as well as those used for full-time occupancy.

Wetlands: Type I - less than 200 Ac.  
Type II - approximately 210 Ac.  
Type V - approximately 42 Ac.  
Type VI - approximately 21 Ac.

Flood Plains: 575 Ac. irrigated cropland  
56 Ac. streambed

Endangered Species - known range for the following:

Black-Footed Ferret, Peregrine Falcon,  
Bald Eagle, Whooping Crane,  
Piping Plover, Least Tern

Migratory bird: Burrowing Owl

Candidate Endangered Species - range for the following:

Birds: Long-Billed Curlew  
Mountain Plover  
Black Tern

Fishes: Arkansas Darter  
Speckled Chub

Mammals: Swift Fox  
Fringed-Tailed Myotis

Plants: Colorado Green Gentian  
Single-Headed Goldenweed

Reptiles: Texas Horned Lizard

Cultural Resources:

From the National Register of Historic Places for  
Colorado:

1. Cokedale Historic District
2. The bridge over Burro Canyon at Colorado Highway 12

From the Determined Eligible Properties List for the National and Colorado Register of Historic Places:

1. Cokedale No. 1/Chinese Tunnel
2. Bear Canyon/Vallaroso

**Problem Identification:**

Three major problems identified in the watershed are: active storage loss due to sedimentation of Trinidad Lake; water quality impairment from sediment loading; and degradation of the resource base from water erosion.

**Candidate Plans Considered:**

One of the candidate plans considered was the "Land Treatment to Control Erosion" plan. It treats gully, sheet, and rill erosion throughout the watershed and reduces sedimentation of Trinidad Lake. A second plan considered was the "No Action" plan which was used to derive potential benefits for the recommended plan.

**Alternatives Considered:**

The following alternatives were considered and evaluated as possible solutions to the Trinidad Lake sedimentation problem:

1. Construct concrete sills in the canyons.
2. Construct large sediment control structures on the major tributaries to Trinidad Lake.
3. Land treatment to control erosion (includes enduring and management practices).
4. Watershed treatment using management only.
5. No action alternative is presented for the purpose of comparing the future without project conditions with the treatment alternatives.

**Project Purpose(s):**

The primary goals of the project are: to achieve a reduction in sediment loading to Trinidad Lake, thereby prolonging its life; and improving the water quality delivered to the lake. These goals will be attained through increased resource base protection.

## Principal Project Measures:

It is expected that 80 long-term land treatment contracts will be written during the project's life. Approximately 58,000 acres will be treated through project action.

PROPOSED PRACTICE LIST TABLE

Practice number and name	Units	Extent
314 Brush Management	Ac.	300
342 Critical Area planting	Ac.	478
350E Sediment Basin (earthen)	No.	203
350R Sediment Basin (rock)	No.	748
350P Sediment Basin (post)	No.	161
352 Deferred Grazing	Ac.	46,935
362 Diversion	L.F.	5,372
378 Pond	No.	6
382 Fencing	Mi.	30
410 Grade Stabilization Structure	No.	6
449 Irrigation Water Management	Ac.	232
510 Pasture & Hayland Management	Ac.	555
512 Pasture & Hayland Planting	Ac.	400
516 Pipeline	L.F.	66,166
528 Proper Grazing Use	Ac.	46,935
530 Proper Woodland Grazing	Ac.	10,430
550 Range Seeding	Ac.	310
556 Planned Grazing System	Ac.	46,380
561 Heavy Use Area Protection	Ac.	10
574 Spring Development	No.	6
614 Trough or Tank	No.	33
642 Well	No.	4
590 Nutrient Management	Ac.	232
595 Pest Management	Ac.	232

<b>Project Costs:</b>	<u>PL-566 Funds</u>	<u>Other Funds</u>	<u>Total</u>
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### Land Treatment Measures:

#### Management practices:

Deferred Grazing	\$70,400	\$0	\$70,400
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#### Enduring Practices:

Sediment Basin	\$363,300	\$164,000	\$527,300
Diversion	\$16,900	\$7,600	\$24,500
Stockwater Developments	\$33,000	\$33,000	\$66,000
Fencing	\$21,400	\$21,400	\$42,800
Grade Stabilization Structure	\$17,200	\$7,800	\$25,000
Pipeline	\$24,800	\$24,800	\$49,600
Range seeding	\$10,100	\$10,100	\$20,200



<b>Project Costs: (Cont.)</b>	<u>PL-566 Funds</u>	<u>Other Funds</u>	<u>Total</u>
-------------------------------	---------------------	--------------------	--------------

**Enduring Practices:**

Critical Area Planting	\$155,000	\$70,000	\$225,000
Brush Management	\$1,800	\$1,800	\$3,600
Pasture & Hayland Planting	\$13,000	\$13,000	\$26,000
<b>Subtotal</b>	<b>\$656,500</b>	<b>\$353,500</b>	<b>\$1,010,000</b>
Technical Assistance	\$397,800	\$0	\$397,800
Administrative Costs	\$44,200	\$6,000	\$50,200
<b>Total</b>	<b>\$1,168,900</b>	<b>\$359,500</b>	<b>\$1,528,400</b>

**Project Benefits:**

The following benefits will be realized through the project:

- . Trinidad Lake storage loss due to sedimentation will be reduced by approximately 104 acre feet (158,600 T.) per year, based on 1,525 tons per acre foot of sediment.
- . The fisheries in Trinidad Lake will be improved due to the the reduction of sediment & other pollutants delivered to the reservoir.
- . Sheet, rill, gully, and streambank erosion will be reduced by more than 104 Ac. Ft. (204,000) tons per year, based on 1,960 tons per acre foot of eroded material.
- . The range resource base will be better protected and its former productivity partially restored.
- . The carrying capacity of the watershed is expected to increase by 6,400 AUMs.
- . Land values will be stabilized.
- . The recreational value of the area will also increase.
- . The overall quality of life will improve.

**Impacts:**

There will be no long-term negative impacts due to project action.

**Natural Resources Changed or Lost:**

Wooded Flood Plain - Quality enhanced for wildlife and recreation through the critical area planting that will take place.

Wetlands - Minimal impact will occur with periodic type changes due to the presence of sediment basins.

Wildlife Habitat - Quality enhanced.

#### **Other Impacts:**

The selected alternative reduces by 61 percent the amount of sediment delivered to Trinidad Lake. A high percentage of the eroded materials in the watershed enter the hydrologic system of the watershed as sediment. Reduced sediment will improve the water quality in Trinidad Lake and lengthen its life.

With project action, sound resource management practices will be implemented on a broader scale than they are presently. As these practices are implemented, it is anticipated that the range and grazeable woodland (Resource Base) within the watershed will improve.

The economy of the area is heavily dependent on agriculture. With the improved resource base within the watershed, the economy is expected to expand.

As the economy expands there will be some resource depletion. The depletion will be in the form of energy, labor and materials, all of which are irretrievable.

#### **Major Conclusions:**

The life of Trinidad Lake will be increased due to decreased sediment loading and a significant improvement in its water quality will be realized. In addition, the land resource base will be maintained or improved. The expected project benefits exceed the costs of the planned treatment.

## INTRODUCTION

This watershed plan describes the plan formulation process, discloses expected project impacts, and provides the basis for authorizing federal assistance for implementation under the Public Law 566 Program. There were no significant adverse environmental impacts identified in the evaluation process; therefore, an Environmental Impact Statement was not prepared. A Notice of Availability of Finding of No Significant Impact and accompanying environmental assessment have been prepared. The sponsoring local organizations are Spanish Peaks Soil Conservation District (SPSCD), Purgatoire River Soil Conservation District (PRSCD), Purgatoire River Conservancy District (PRCD), Las Animas County, City of Trinidad, and the Colorado State Soil Conservation Board (CSSCB).

The U.S. Department of Agriculture's Soil Conservation Service (SCS) assisted the sponsors with the development of the plan.

The plan was prepared under the authority of the Watershed Protection and Flood Prevention Act, Public Law 83-566, as amended (126 USC 1001-1008), and in accordance with Section 102(2) (c) of the National Environmental Policy Act of 1969, Public Law 91-190, as amended (42 U.S.C. 4321, et seq). Responsibility for compliance with the National Environmental Policy Act rests with the Soil Conservation Service.

All information and data presented herein, unless otherwise noted, were collected by the Soil Conservation Service during watershed planning investigation.

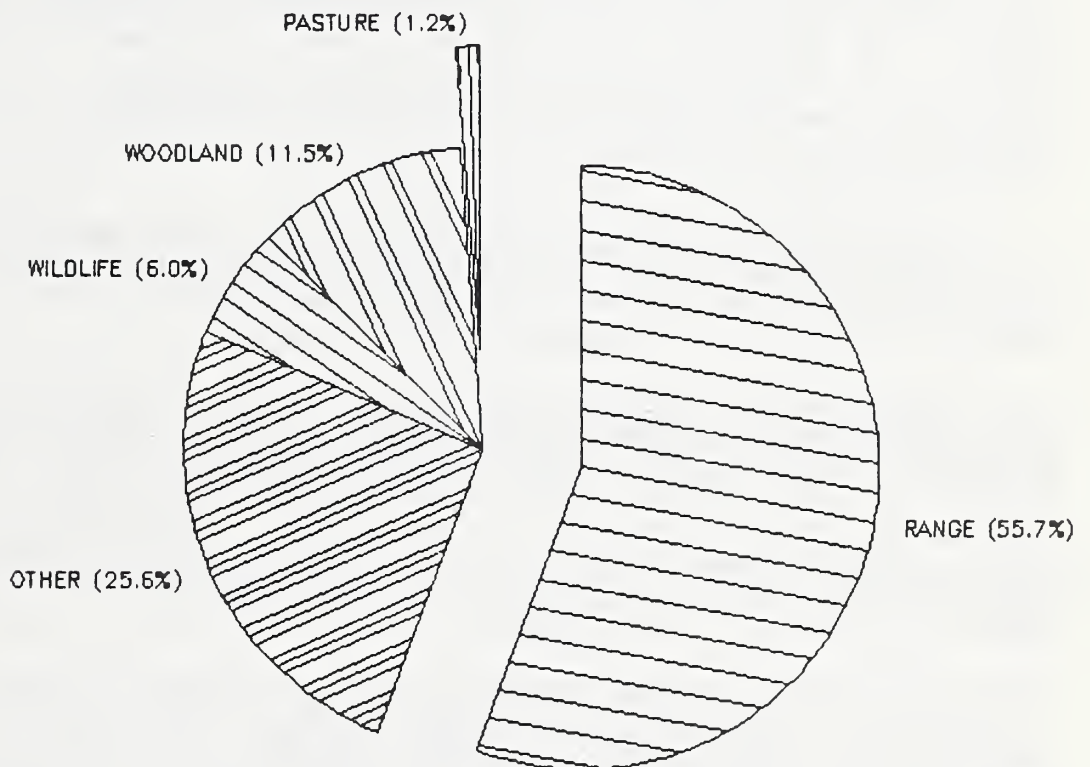
The plan has been formulated to address the problem of excessive sediment deposition in Trinidad Lake as well as range deterioration. With this deposition, a water quality problem has been created and is also addressed.



## PROJECT SETTING

Trinidad Lake North Watershed is located three miles west of Trinidad (pop. 9663), Las Animas County, Colorado. Trinidad is located 86 miles south of Pueblo (pop. 101,686). The project area includes all of Reilly, Burro, Sarcillo, and Wet Canyons. It contains 111,167 acres (174 square miles) of drainage area and empties into the Purgatoire River upstream of Trinidad Lake. Purgatoire River is a tributary to the Arkansas River with its confluence at Las Animas, Colorado.

TRINIDAD LAKE NORTH WATERSHED  
LAND USE



The area is characterized by warm summers (90 degrees Fahrenheit) and cold winters (-25 degrees Fahrenheit). Precipitation in the watershed varies from 12-20 inches annually, depending on the elevation, with the majority occurring in the spring and summer. During the summer, high intensity localized cloud bursts" occasionally produce from one to two inches of rainfall in less than an hour. The growing season at Trinidad (early-May to mid-October) averages 160 days.



The elevation in the watershed ranges from 6,280 to 10,300 feet above mean sea level. The topography, sloping southeast, ranges from rolling rangeland in the lower portion to steep mountain slopes in the upper portion.

The geologic formations of the area include: the Raton and Vermejo Formations. The Vermejo Formation consists of carbonaceous and sandy shale with lenses of arkosic sandstone and coal. This formation rests on Trinidad sandstone. It is generally overlain by the Raton Formation. At the base of the Raton Formation is sandstone and conglomerate. Above these materials, sandstone, siltstone, shale, and lenticular coal beds are found. Both these formations are coastal-plain deposits. The Raton Formation grades into the Poison Canyon Formation. This is a conglomerate formation which is interbedded with shale. This formation is overlain with the Cuchara Formation and consists of red, pink, and white sandstone interbedded with shale. The Huerfano Formation overlies the Cuchara Formation and consists of shale and red, white, and tan sandstone, as well as a basal conglomerate sandstone. Rocks of the Cuchara and Huerfano formations are metamorphosed to conglomerate quartzite, hornfels, and slate.

There are also intrusive rocks in the area. These include the Spanish Peaks stocks as well as numerous sills and dikes. The Spanish Peaks stocks are composed of syenodiorite porphyry, granite porphyry, and granodiorite porphyry.

The soils are shallow and well-drained, formed in place from the weathering of sandstone or shale. Slopes range from 3 to 65 percent. The available water holding capacity varies from .08 in./in. to .16 in./in. The runoff is medium to very rapid, and the hazard of water erosion is very high. The erosion "K" factor ranges from .1 to .24, while the "T" factor varies from 1 to 2 for the majority of soils. A hydrologic group of "D" applies to most of the soils.

The economy of the watershed area is based on agriculture (ranching). More than 90 percent of the range in the watershed is in fair or poor condition which equates to .13 to .25 animal unit months (AUMs) per acre. Its potential is .45 AUMs per acre. The grazeable woodlands are in similar condition. They produce between .05 and .17 AUMs per acre; however, the potential is between .3 and .33 AUMs per acre. These present conditions are conducive to accelerated erosion and resource base deteriorating.

To provide water for these rangelands, several stock water ponds have been constructed. In addition to these ponds, several multiple-purpose and erosion control dams have been constructed within the project area. These also provide water for livestock in the area at times.

Vegetation communities in the watershed consist mainly of grazeable pinion-juniper and ponderosa pine woodlands with



smaller amounts of Douglas-fir and spruce-fir woodlands. Blue grama and western wheatgrasses are the dominant species on the upland range sites. Historically, most of the watershed has been overgrazed. Thirty-five percent is considered in poor range condition, 34 percent in fair condition, and 31 percent in good condition.

Historically, mining in the Trinidad area was the major economic contributor. However, since World War II, mining has decreased and only a few mines remain. There are no active mines within the watershed.

The Trinidad Lake Flood Control Project was authorized for construction by the U.S. Army Corps of Engineers on July 3, 1958, and completed in 1976 at a cost of \$52,500,000. Trinidad is a multiple purpose reservoir. It is used for flood control, irrigation storage and regulation, sediment retention, and recreation.

#### TRINIDAD LAKE AUTHORIZED STORAGES

51,000 Ac. Ft. - Flood Control, at elevation 6259.6
20,000 Ac. Ft. - Irrigation, at elevation 6226.4
39,000 Ac. Ft. - Joint Storage, at elevation 6209.3
4,500 Ac. Ft. - Recreation Pool, at elevation 6142.8

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114,500 Ac. Ft. - Total active Storage

The 39,000 Ac. Ft. of joint-use active storage is used for irrigation water, fish and wildlife, and the accumulation of sediment. This active-use storage will be used until depleted due to sedimentation.

The project provides irrigation water storage for many farms and ranches in the area. It is also a major recreation area for both in-state and out-of-state visitors.

Irrigated farming has been and is important to the economy of the Trinidad area. Model Reservoir was the main source of water for irrigation. The reservoir was abandoned due to the loss of capacity from sediment deposition. The irrigation water storage rights from Model Reservoir were transferred to Trinidad Lake. Water stored in the lake now irrigates 19,717 acres downstream from Trinidad.

The recreational income centered around Trinidad Lake has become important to the economy of the area and has helped to offset the loss of income due to the decrease in mining activities.

Trinidad Lake provides excellent fishing. Rainbow and mackinaw trout, largemouth bass, channel catfish, blue gill, walleye, and crappie are stocked in the lake. Rainbow trout are

stocked biweekly from May through August. Approximately 1.8 million walleye are stocked per year. Brown trout populations are maintained without stocking. The Colorado Division of Wildlife (DOW) and Colorado Department of Parks and Outdoor Recreation (CDPOR) figures show a sharp increase in fishing. In 1981, there were 9,233 trips recorded. In 1986, the number of trips increased to 64,255. In 1984, the fishing trips decreased by 40 percent due to the large number of sediment producing rainstorms. The above figures are daytime summer visits only and do not include either winter fishing or night fishing pressures.

The total visitations counted at the lake for 1986 was 180,247. Of the total, 82 percent were from other states, with Texas alone accounting for 33 percent, while 18 percent were from Colorado. The data used in the above analysis did not include the visitations made by those who hold annual passes. Most Coloradan visitors have annual passes. If the visitations of annual pass holders were included in the data, it is estimated that the total annual visits would be 50-75 percent greater. DOW estimates the value of a visitor day at \$50 for the counted visits.

The available municipal and industrial water (7,500 ac. ft.) stored in Trinidad Lake also helps to encourage businesses to develop in the Trinidad area. The City of Trinidad is presently negotiating for additional water for municipal uses.

The Trinidad Lake Flood Control Project reduced the flooding hazard to the City of Trinidad, thereby encouraging economic growth, reducing the threat of loss of life, increasing community pride, and improving the quality of life.

It is anticipated that the need for all types of outdoor recreational areas will continue to increase. Trinidad Lake is the only major water-based recreation area within 100 miles. The DOW is negotiating the purchase of additional water which could double the recreational use.

There are 114 ranch operating units ranging from 35 to 10,000 acres within the watershed. Much of the upper watershed area has been subdivided into 35 acre or more tracts of land. Within this upper portion of the watershed, there are 412 landowners. These tracts, with their panoramic view and close proximity to summer water-based recreation and winter downhill and cross-country skiing, have made the area a popular location for summer and year-round recreational home site developments.

The area previously had an active mining industry, however there are no active mines at this time. The area is considered economically disadvantaged, as 25 percent of the rural residents fall into the low income category, and the January-April 1991 unemployment rate was 9.4 percent. Also, over 45 percent of the landowners are of Hispanic origin.

## **PROBLEM AND OPPORTUNITY IDENTIFICATION**

This section identifies the types of problems which exist in the watershed. The problem areas are identified and the extent of the problems within each area are quantified. Potential opportunities to improve the quality of life and enhance environmental values will also be discussed.

The problems within the watershed include the following:

### **SEDIMENTATION OF TRINIDAD LAKE**

- . The average annual sediment loading from the project area reduces the amount of active storage in Trinidad Lake by 166 Ac. Ft. annually.
- . The reduced recreational value of Trinidad Lake and the surrounding area due to erosion and sedimentation. The Colorado Division of Wildlife (CDOW) stated that the effects of silt load and turbidity on the fishery can be varied. Heavy silt loads during spawning can affect egg viability. Siltation and turbidity can adversely affect water temperatures for salmonoids. Loss of habitat is a key affect of siltation. The prevention of any degradation of the fishery at Trinidad Lake from sedimentation can be very important economically to the Trinidad area.

### **WATER QUALITY IMPAIRMENT FROM SEDIMENT LOADING**

- . The decrease in water quality in Trinidad Lake. The Colorado Non-point Assessment Report identified drainages found in the Trinidad Lake North Watershed to be major contributors of sediment and heavy metals to the Purgatoire River, which is the major source of water for Trinidad Lake. The total lead and chromium concentrations within the river reach impacted by this watershed exceed water supply standards by several magnitudes. The limits for agriculture are exceeded by lead, manganese, and copper. Aquatic life values are exceeded for total iron, zinc, nickel, lead, mercury, manganese, and cadmium. The total metals concentrations are many times the standards for iron, copper, lead, nickel, and zinc. The previously mentioned heavy metals are transported along with sediment to Trinidad Lake.

### **DEGRADATION OF RESOURCE BASE FROM WATER EROSION**

- . Lack of adequate cover to protect the land from erosion.
- . The loss in productivity on the range, pasture, and grazeable woodlands from erosion.



- . The increased costs to the county for road maintenance due to deposition of sediment and road erosion.
- . Ponds prematurely lose their effectiveness due to excessive sedimentation.
- . Wildlife habitat deterioration due to erosion and sedimentation.
- . A decreasing quality of life.

Analysis of the watershed identified a change in operating unit size as you go from the bottom to the top. Those units in the upper portion of the watershed were generally less than 160 acres in size. The majority of this area is composed of grazeable woodlands. Approximately 51 percent of the sheet and rill erosion is attributable to the 82,930 acres found in this portion of the watershed. Nineteen percent of the gully and road erosion occurs in this region, which comprises 75 percent of the project's area.

The lower portion of the watershed is predominantly operating units larger than 160 acres. This area is composed primarily of rangeland. This portion of watershed is approximately 28,200 acres in size, or 25 percent of the watershed area. Approximately 49 percent of the sheet and rill erosion and 81 percent of the gully and road erosion occurs in this portion of the watershed. Sluffing banks in gullied areas are receding at a rate of approximately 0.2 foot per year.

#### EROSION AND SEDIMENT DELIVERY SUMMARY Trinidad Lake North Watershed

	<u>Erosion 1/</u>		<u>Sediment Delivery Ratio</u>	<u>Sediment reaching Trinidad Lake 2/</u>	
	<u>Tons</u>	<u>Ac. Ft.</u>	<u>Percent</u>	<u>Tons</u>	<u>Ac. Ft.</u>
Sheet & Rill	134,400	69	70	94,100	62
Gully	134,300	68	80	107,400	70
Roads	<u>64,700</u>	<u>33</u>	80	<u>51,700</u>	<u>34</u>
Totals	333,400	170		253,200	166

1/ For Erosion - tons of soil loss was converted to Ac. Ft. using as factor of 1960 tons/Ac. Ft.

2/ For Sediment reaching Trinidad Lake - tons of sediment was converted to Ac. Ft. using a factor of 1525 tons/Ac. Ft.

#### ON-SITE PROBLEMS

Range condition poor/fair	70 percent
Soil moisture retention	decreasing
Multi-purpose and Erosion Control Dam	life reduction
Fence Damage	\$3,500 annually
Wildlife habitat quality	diminishing
Area recreational value	decreasing
Area aesthetic value	decreasing

#### OFF-SITE PROBLEMS

Trinidad Lake annual storage loss due to sediment	166 Ac. Ft.
Trinidad Lake metals concentration	excessive
Annual road damage from runoff	\$41,300

There are many opportunities to improve the environment within the watershed. The condition of the approximately 62,000 acres of range can be improved through the application of proper range management techniques. The 13,000 acres of grazeable woodland provide an opportunity to apply proper woodland grazing. The 1,300 acres of pasture and hayland can benefit from the application of pasture and hayland management techniques. There are many sites needing sediment basins along the 177 miles of gullies in the watershed. There are also many areas where diversions would be beneficial. There are also ample opportunities to do critical area plantings to slow the erosion along gullies and on structural embankments.





## INVENTORY AND FORECASTING

### Scoping of Concerns

The problems and opportunities of the Trinidad Lake North Watershed are directly related to the capabilities and the degree of management or mismanagement of the watershed's resources. The inventory and analysis phases for this plan used a scoping process to identify those economic, environmental, and social areas of primary concern. Specialists gathered detailed information on the current resource conditions. A projection of future conditions was made in order to formulate and compare alternatives and estimate their impacts.

During the initial stages of planning an analysis of a broad range of economic, environmental, and social factors in the watershed was carried out. Those factors that were directly related to the problems and opportunities and/or those that might be significantly affected by any potential project were considered. Table A lists the factors considered in this scoping process and their perceived significance to project formulation and decision-making.

Factors rating "Low" or "None" in Table A were not likely to be affected by the project and were considered insignificant to decision-making. Therefore, these factors are not discussed in this document. Those factors that have a "High" or "Medium" impact on the watershed would be affected by the project and were considered as significant in decision making. A detailed study was then made on these factors by assessing the current conditions, formulating and comparing alternatives, and determining impacts of a selected plan.

Excessive erosion on range and grazeable woodland was identified as a concern during this process. Along with this erosion came the concern over sedimentation in Trinidad Lake as well as other multi-purpose ponds in the area. The potential loss of floodwater protection in Trinidad Lake due to sediment loading was also noted. In that Trinidad Lake is used for recreation, water quality was identified as a concern.

The turbidity of Trinidad Lake, caused by sediment loading, may have negative effects on the lake as well as the associated wetlands.

Wildlife species of the area are typical of southern Colorado. The wildlife population includes moderate numbers of mule deer, high numbers of black bear and turkey, as well as a limited elk herd. The lack of riparian vegetation along streams in the watershed adversely impacts wildlife. The fur bearing game and non-game animals present in the area are represented by

such species as weasel, skunk, badger, prairie dog, ground squirrel, lizard, and snake.

The water quality reaching Trinidad Lake is being impaired, due in part to the present resource management within the watershed. Degradation of the range, grazeable woodland, pasture, and soil resource is occurring at an accelerated rate. The wildlife habitat is also being impacted.

The 20,000 Ac. Ft. irrigation pool, as well as the 39,000 Ac. Ft. of the joint-use pool of Trinidad Lake, are being reduced at an excessive rate due to sedimentation. The irrigated land in the area plays a significant role in the economy of the area. The excessive rate of loss of irrigation storage jeopardizes the use of irrigation in the area.

There are no known threatened or endangered plants or animals in the watershed. The watershed area is in the historic range for the greenback cutthroat trout, Arkansas darter, gray wolf, grizzly bear, black-footed ferret, and river otter. None of these species are known to exist in the watershed area at this time. However, there are prairie dog towns in the watershed that could provide at least one component of the habitat required for the black-footed ferret. Eagles are known to exist in Colorado, but no concentrated or preferred use areas for eagles have been identified in the watershed area.

The Colorado Office of Archaeology and Historic Preservation conducted a search of the Colorado Inventory of Cultural Resources and found significant cultural features in the watershed. The Town of Cokedale, including the Coke Ovens Site, as well as the bridge over Burro Canyon, is on the National Register of Historic Places. In the event additional sites are identified that may be altered or damaged by project actions, work will stop until the applicable provisions of Public Law 93-291 and/or Public Law 89-665 have been complied with. Applicable state laws dealing with archaeological and historical site preservation will also be complied with.

The ranching industry has a major impact on the Trinidad community. There is concern that the economy will be negatively impacted if the range and grazeable woodland resource is not adequately protected.

Trinidad provides both summer and winter recreational opportunities. The water based recreation associated with Trinidad Lake is being negatively impacted by sediment loading.

The soil resource is presently eroding away at an excessive rate generating large amounts of sediment. Evidence of this is seen in the pedestaling which is occurring.

This sediment is carried by excessive runoff, which is also a concern in regard to maintaining soil moisture.

Table A - Evaluation of Identified Concerns

Analysis of Economic, Environmental, Social Factors,  
and Cultural Concerns Significant to Decision-Making

Economic, Social Environmental, and Cultural Concerns	Degree of Significance to Decision making	Remarks
Erosion	High	Water
Sedimentation	High	On-site and off-site
Floodwater	High	Silt load & flooding
Land Use	Low	
Prime, Unique, or Important Agricultural Land	None	
Streams	Low	
Trinidad Lake	High	Sedimentation
Fish Habitat	Medium	Trinidad Lake
Wetlands	Medium	Potential to improve
Wildlife	High	Potential for improvement with project
Groundwater	Low	
Water Quality	High	Trinidad Lake (multiple uses)
Irrigation	Medium	Loss of storage
Endangered & Threatened Plants & Animals	High	Not effected
Cultural Resources	High	No negative effects expected
Economic	High	Potential to improve
Recreation	Medium	Improve Area's Value
Transportation	Medium	Road damages
Soil Resources	High	Topsoil condition
Soil Water Conservation	High	Rangeland improvement
Social Resource	Low	
Visual Resources	Low	
Air Quality	Low	

- 
- 1/ High - Must be considered in the analysis of alternatives  
Medium - May be affected by some alternative solutions  
Low - Consider, but not too significant  
None - Need not be considered in analysis



## Existing Resource Conditions

More than 90 percent of the range in the watershed is in fair or poor condition, which equates to .13 to .25 animal unit months (AUMs) per acre. Its potential is .45 AUMs per acre. The grazeable woodlands are in similar condition. They produce between .05 and .17 AUMs per acre; however, the potential is between .3 and .33 AUMs per acre. These present conditions are conducive to accelerated erosion. The soil resource within the watershed is deteriorating at an excessive rate due to erosion.

Based on the U.S. Army Corps of Engineers 75-year design life for Trinidad Lake, there are about 60 years of the design life remaining for Trinidad Lake. The watershed inventory and evaluation found that the Lake's conservation and recreation pool is decreasing in size, due to sediment loading from the project area, at a rate of 166 Ac. Ft. per year.

The aquatic habitat of Trinidad Lake is being negatively impacted by the quality of water entering from the watershed. This water exceeds the limits in heavy metals for aquatic life.

The value of the wetland habitat within the watershed is below its potential, based on the known extent of soil movement taking place and its effects on habitat.

The upland wildlife habitat is also not at its potential in terms of quality and quantity of forage or cover. This is related to the condition of the range and grazeable woodlands in the area. Colorado Division of Wildlife (CDOW) figures show that the present deer herd in and adjacent to the watershed is approximately 11,000. The long-range objective of the CDOW is to have a herd of 12,000 in the same area. The CDOW estimates the elk population in and adjacent to the watershed to be approximately 2,000. The long-range goal for the herd is 2,500.

At present, Trinidad Lake is able to store adequate irrigation water to meet the needs of irrigated agriculture in the area. The irrigation water in the lake is used to irrigate land downstream. As sedimentation takes place, the average of 104 acre feet of water per year will no longer be usable for irrigation. The irrigation delivery systems which serve the watershed also suffer annual damages due to sedimentation and runoff.

The wildlife population of the watershed at this time does not include endangered species.

Cultural resources within the project area, such as old coke ovens and bridges, are not presently in jeopardy from the excessive erosion in the watershed.

The local economy is depressed, with roughly 25 percent of the rural residents falling into the low income category.

Trinidad Lake provides over 200,000 recreation days annually to the area. The quality of big game hunting in the area is below its potential in that the big game population is also below its potential. The quality of the hiking and cross-country skiing experience is below its potential due to the condition of the forage plant community.

The roads in the project area incur \$41,300 in damages annually due to erosion and sedimentation. The railroad is also being damaged by flooding and sedimentation.

Ground cover plays an important part in preserving soil moisture. The reduced ground cover is allowing premature depletion of soil moisture.

Information for this project was collected in the field by Soil Conservation Service (SCS) personnel. Seventy-eight percent of the land area within the watershed was inventoried.

### **Forecasting Conditions**

The total erosion per year will probably continue to be at least 170 Ac. Ft. (333,400 tons), which is the current rate. Sheet and rill erosion will contribute an estimated 69 Ac. Ft. (134,400 tons) per year. Gully erosion is expected to be 68 Ac. Ft. (134,200 tons) or greater per year without project action. Erosion from roads will be at a minimum 33 Ac. Ft. (64,700 tons) per year.

The storage capacity of Trinidad lake, which is a multiple-use reservoir, is and will continue to be reduced at a rate of 166 Ac. Ft. per year by sedimentation from the project area. This will reduce recreational and irrigation water supplies. Existing stock water and erosion control structures will also have their expected life decreased due to sedimentation. The accelerated sedimentation from the project area will continue to damage irrigation structures in the future.

The water quality of Trinidad Lake is expected to be impaired periodically due to sediment. During this period the quality of the fish habitat is reduced. This also reduces the recreational value of the lake.

The wetlands within the area are being damaged by erosion and sedimentation. Because of the instability of these areas, the natural establishment of high quality wetlands is not anticipated in the future.

The numbers and species of wildlife supported by the area will decrease due to an expected deterioration of habitat. An endangered or threatened species population is not expected to establish itself or be re-established in the future.



It is not anticipated that the known cultural resource sites in the area will be disturbed, either with or without project implementation.

The forage production of the area will probably be less than the present 10,900 animal unit months (AUMs) per year. Since the area's economy is affected to a great extent by ranching, this loss of forage production will have a significant negative impact.

With this expected deterioration of the forage resource, the area becomes less aesthetically appealing. The net effect will be a decrease in the interest to engage in outdoor recreation in the area. This will then affect the economy of the area.

With the anticipated deterioration in ground cover, erosion will accelerate. This acceleration will cause deterioration of the soil resource. The ability of the soil to retain soil moisture will decrease in direct proportion to the soil resource deterioration. This acceleration will also precipitate increased costs in road and railroad maintenance.

The on-going programs do not provide an adequate amount of financial incentive or training to implement sound resource management systems. The existing programs which provide cost-sharing for conservation practices include: the Agricultural Stabilization and Conservation Service's (ASCS) Agricultural Conservation Program (ACP) and the SCS's Great Plains Conservation Program (GPCP). Based on a review of the past 20 years of cost-share assistance through these programs, degradation is expected to continue at its present rate or accelerate on the untreated areas of the watershed. At the present rate of conservation measure implementation within the area, the resource base will continue to degrade. This supposition is based on a review of the SCS field office records of past conservation measure application and the condition of the resources within the watershed.



Project will reduce sediment and improve water quality to the lake.



Sediment deposited in upper end of Trinidad Lake.





Gully erosion  
on rangeland



Road & bridge  
damage

Rangeland erosion  
due to overgrazing









Rock sediment basins installed  
to reduce gully erosion.



Critical area planting using willows  
to stabilize eroding banks.



## FORMULATION OF ALTERNATIVES

### General

The following objectives were defined by the project sponsors at the onset of the project: (1) reduce the sedimentation occurring in Trinidad Lake; and (2) improve the land resource base. Data was collected during field inventories and expanded to reflect the condition and needs for the entire watershed. Treatment alternatives were considered and defined, based on the types and extent of erosion taking place. The sponsors participated in the formulation of several treatment alternatives. The effectiveness of each alternative in reaching the goals of the sponsors was evaluated and a recommended plan selected.

### Formulation Process

With the sponsors objectives identified, two levels of inventories were conducted. A cursory inventory of the entire watershed, followed by a detailed inventory of 78 percent of the area, was carried out. The total needs for the sampled area were identified. A list of potential measures to deal with the identified problems was drafted based on measure effectiveness, efficiency, and acceptability. This list contained all the measures that dealt with the inventoried needs and sponsors objectives.

The watershed was evaluated as one treatment unit during the formulation process. Alternatives were formulated based on the project objectives. These alternatives were evaluated using the four criteria: completeness, effectiveness, efficiency, and acceptability.

Three approaches to treatment were considered and various alternatives were developed incorporating these various approaches. The approaches included large structural measures, only changing management, and a combination of management changes and small enduring measures.

The following alternatives were derived during this process:

1. Construct concrete sills in the canyons.
2. Construct large sediment basins on the major tributaries to Trinidad Lake.
3. Land treatment to control erosion (includes enduring and management practices).
4. Watershed treatment using management only.
5. No action alternative is presented for the purpose of comparing the future without project conditions with the treatment alternatives.

## Evaluation of Alternative Plans

A discussion of the alternatives follows.

### Alternative 1 - CONSTRUCT CONCRETE SILLS IN THE CANYONS.

**Components:** It was estimated that 235 such structures would be needed. These would be placed in the larger gullies within the watershed.

**Costs:** Total project cost - \$21,000,000  
Average annual cost - \$2,300,000

**Effects:** The short-term effect would be to reduce the amount of sediment reaching Trinidad Lake. It would do little to protect the resource base, and thereby fails in its completeness to address all the sponsors' concerns.

### Alternative 2 - CONSTRUCT LARGE SEDIMENT BASINS ON THE MAJOR TRIBUTARIES TO TRINIDAD LAKE.

**Components:** This alternative would involve the installation of 15 large structures. These structures would again be placed in major drainages to Trinidad Lake.

**Costs:** Total project cost - \$7,000,000  
Annual project cost - \$700,000

**Effects:** These structures would reduce the amount of sediment reaching Trinidad Lake significantly. The resource base would continue to deteriorate at near its present rate. Therefore, it fails in its completeness with regard to addressing all the concerns of the sponsors.

### Alternative 3 - LAND TREATMENT TO CONTROL EROSION (INCLUDES ENDURING AND MANAGEMENT PRACTICES).

**Components:** This plan consists of accelerating land treatment on approximately 58,000 acres of range, grazeable woodland, pasture, and hayland. Enduring measures which will be cost-shared include: sediment basins, diversions, ponds, fencing, grade stabilization structures, pipelines, troughs, wells, brush management, critical area planting, range seeding, pasture and hayland planting, and spring developments. The management practices which will be used to address the concerns related to the formulated objectives are:

#### Cost-shared

Deferred grazing

#### Non Cost-shared

Proper grazing use  
Planned grazing systems  
Pasture and hayland management  
Proper woodland grazing



**Costs:** Total project cost - \$1,528,400  
Average annual cost - \$181,900

**Effects:** The amount of sediment entering Trinidad Lake is estimated to be 104 acre feet per year (158,600 tons) less in the future. This will significantly prolong the life of the lake. There also will be an increase of 6,400 AUMs. Annualized benefits of \$211,400 will be accrued. Annualized net benefits are \$29,500. A significant improvement in water quality, in terms of sediments and metals reaching Trinidad Lake, is realized. Significant improvement of the wildlife habitat will be seen in the future. A marked improvement in the area's recreational value will occur. The economy of the area will improve with the increase in the area's livestock and wildlife carrying capacity, as well as the improved conditions for various recreational opportunities. An enhanced quality of life will be achieved.

#### **Alternative 4 - WATERSHED TREATMENT USING MANAGEMENT ONLY**

**Components:** Alternative four consists of primarily management measures with only the enduring measures necessary to attain range and grazeable woodland management being installed. The enduring measures include: ponds, fencing, pipelines, spring developments, wells, and troughs or tanks. The management type measures included in this alternative are the same as those used in the previous alternatives.

**Costs:** Total project cost - \$469,950  
Average annual cost - \$48,800

**Effects:** The amount of sediment estimated to enter Trinidad Lake will be 28 Ac. Ft. (42,600 tons) less in the future via implementing this alternative. There will be an increase of 4,900 AUMs in the future. Average annual benefits of \$70,000 will be accrued. Net benefits are \$21,200 annually. Some improvement in water quality, in terms of sediments and metals reaching Trinidad Lake, is realized. Wildlife habitat will be improved considerably in the future. An improvement in the area's recreational value will be achieved. The economy of the area is expected to improve somewhat, primarily due to a slight increase in the area's livestock and wildlife carrying capacity, as well as some improved conditions for various recreational opportunities. It fails in its completeness of addressing the sponsors' objectives in reducing the sediment to Trinidad Lake and protecting the resource base. It also fails in acceptability by the sponsors and cooperators.

#### **Alternative 5 - NO ACTION**

**Components:** Alternative five consist of applying conservation measures with existing programs and technical assistance. All the structural and management measures included in alternative three are available for use in this alternative.



**Costs:** Average annual cost - \$15,000 (ACP & GPCP - within watershed annually)

**Effects:** The funding is inadequate to significantly affect a change in the resource conditions. The amount of sediment entering Trinidad Lake will exceed 166 Ac. Ft. (253,000 tons) annually. The number of AUMs available will probably decrease from the present 10,900. Water quality will continue to deteriorate from sediments and metals reaching Trinidad Lake. Wildlife habitat will also continue to deteriorate. No improvement in the area's recreational value will be achieved. The economy of the area will slide downward. This will be due to the decreased livestock and wildlife carrying capacity in the area, as well as the deteriorating conditions for various recreational opportunities.

#### **Comparison of Candidate Plans**

Alternatives three and five are the only candidate plans. Alternative three is the National Economic Development Plan (NED) and the Resource Protection Plan (RP). Refer to table "B" for a comparison with the "No Action" alternative.

TABLE B - SUMMARY AND COMPARISON OF CANDIDATE PLANS

Account	Without Project	Alt. 3 Land Treatment	Account	Without Project	Alt. 3 Land Treatment
Measures					
See Page 4 of Summary Section					
NATIONAL ECONOMIC DEVELOPMENT ACCOUNT					
Project Investment	\$0	\$1,528,400	ADVERSE EFFECTS	Significant	Short-term during construction
Beneficial, Annualized	\$0	\$211,400			
Net Annualized Benefits	\$0	\$29,500			
REGIONAL ECONOMIC DEVELOPMENT					
Positive Effect, Annualized Region			Cultural Resources	None	None
Annual Sediment damage	\$168,300	\$62,900	Positive Economic Impact	None	Significant
Productivity Lost Annually	\$242,600	\$189,600	Land Resource recreation Benefits	None	Slight
Annual Pond Damage	\$30,500	\$6,900	Trinidad Lake Annual Visitations	Decrease	Increase
Annual Fence Repair	\$3,500	\$2,400	Transportation (Roads, etc.)	Accelerated Damages	Decreased Damages
ENVIRONMENTAL QUALITY ACCOUNT					
BENEFICIAL					
Trinidad Lake Storage Savings	None	104 Ac. Ft./yr.	Land Resource Protection	Continued Resource Deterioration on 77,000 Ac.	Protect approximately 58,000 acres
Floodwater Damage	Excessive erosion	Silt loading slight	Flood Protection	Trinidad Lake storage reduction 166 Ac. Ft./Yr.	Trinidad Lake storage reduction 62 Ac. Ft./Yr.
Fish Habitat Improvement	None	Slight			
Wetlands	Quality diminished	Quality improved			
Wildlife Habitat Improvement	None	Slight			
Water Quality	Impaired	Greatly improved			
Threatened & Endangered Plants & Animals	None	None			
Soil Resources Lost	333,252 T./yr.	126,715 T./yr.			
Soil & water	None	Significant			
ENVIRONMENTAL QUALITY ACCOUNT					
ADVERSE EFFECTS					
Land & water Resource Deterioration					
SOCIAL EFFECTS					
BENEFICIAL					
Cultural Resources					
Positive Economic Impact					
Land Resource recreation Benefits					
Trinidad Lake Annual Visitations					
Transportation (Roads, etc.)					
Irrigation Storage in Trinidad Lake					
Land Resource Protection					
Flood Protection					

## **Project Interaction**

The purpose of this plan is to reduce the sedimentation occurring in Trinidad Lake and protect the resource base within the watershed. This will be accomplished by accelerating the installation of conservation practices that are also being carried out by the on-going programs, ie. ASCS-ACP, SCS-GPCP, and the state's Forestry Improvement Program (FIP). The candidate plan will not conflict with or supersede the on-going programs of the area. There are no other federal, state, or local programs in the watershed.

## **Risk and Uncertainty**

There is some uncertainty with regard to the benefits from implementing the candidate plan. This uncertainty is due in part to the unknown level of acceptability of the measures planned, as well as the extent of implementation which will occur. The estimate of the benefits to be derived are based on our past experiences and data obtained through interviews with landowners within the watershed. Some of the work is planned to be accomplished with volunteer labor. The availability of this type of labor will have an impact on the cost and extent of certain practice application. The economic atmosphere surrounding agriculture will have a bearing on how much and how fast conservation treatment is attained. There is always some uncertainty with regard to the acceptability of the practices proposed.

Weather patterns will also have an affect on project implementation. If a wet period of years occurs, more people may see a need to reduce water erosion, which may increase conservation practice application.

During early meetings with potential sponsors and landowners, there seemed to be adequate interest to warrant a project. Interest of the landowners in the project has increased since the beginning.

As inventory data was collected through landowner interviews, it was found that most of them were interested in participating in the project. This being the case, it is felt there is a high possibility of plan implementation.

## **Rationale for Plan Selection**

Table B presents a comparison of the costs, benefits, and impacts of the identified problems and opportunities of the candidate plan with the "No Action" plan. It consists of management as well small structural type practices. These practices will be applied on rangeland, grazeable woodland, and pasture and hayland. All the resource concerns are addressed in the plan.

A combination of practices were used for each increment, for sheet and rill erosion reduction and for gully erosion reduction that met the test of effectiveness, efficiency and acceptability. To determine benefits versus cost, using incremental analysis, emphasis was placed on achieving the greatest net return for planned actions. It was on this basis that an alternative was selected as the National Economic Development (NED) plan.

**TABLE C INCREMENTAL ANALYSIS OF NED PLAN**  
**Trinidad Lake North Watershed 1/**  
**(Alternative 3 - Land Treatment)**

Description of Increment	Annual Cost		Annual Benefits		Net Benefits
	Incremental Cost	Total Cost	Incremental Benefit	Total Benefit	
	\$	\$	\$	\$	\$
Sheet & Rill Practices <u>2</u> /	66,900	66,900	92,700	92,700	25,800
Gully Erosion Practices <u>3</u> /	115,000	181,900	118,700	211,400	29,500

1/ Practices were amortized over a 25-year period at 8 3/4 percent. Operation, maintenance, and replacement costs as well as technical assistance and project administration costs were included.

2/ Practices include deferred grazing, diversions, stockwater developments, pipelines, fencing, a portion of critical area planting, range seeding, brush management, and pasture and hayland planting.

3/ Practices include: sediment basins, a portion of critical area planting, and grade stabilization structures.

There are no significant long-term negative effects related to this plan. In the short-term, however, there may be a slight increase in erosion due to the soil disturbance which will occur during the implementation of enduring practices.

All the beneficial effects of the plan cannot be expressed in terms of dollars. The amount of erosion occurring is reduced by 104 acre feet per year thus helping to improve the resource base. This in turn improves the water quality of Trinidad Lake. As the water quality improves there is a coinciding increase in the quality of the fishery in Trinidad Lake, which has a significant impact on the economy of the area. A high degree of road safety is achieved through the reduction in road damage accomplished through this plan.

Of great concern nationally is water quality. The erosion and resulting sediment in the watershed is contributing to a



water quality concern. The uses involved are wildlife and water based recreation. Excessive amounts of metals have been found in the transported eroded material. This plan reduces the amount of erosion occurring in the watershed by 61 percent. It also provides the greatest benefits to wildlife of the alternatives considered. Of major concern to the local sponsors is the amount of gully erosion occurring in the watershed. This concern is addressed completely. Tied to this concern is the concern over sedimentation in Trinidad Lake. The recommended plan reduces the amount of sediment that is presently being deposited in Trinidad Lake from the entire river basin by more than 20 percent.

Flooding is also an area of concern for residents. The amount of flood protection provided by Trinidad Lake is proportional to its storage capacity. Of the alternatives considered, the recommended plan does the best job of preserving the lake storage capacity.



# RECOMMENDED PLAN

## General

The "Land Treatment to Control Erosion" plan was selected as the recommended plan. This plan provides technical and financial assistance to accelerate the installation of conservation systems on rangeland, pastureland, and grazeable woodland within the watershed. The measures needed are identified in Table 1. Management practices will be the primary tools to address sheet and rill erosion in the watershed. Sediment basins and diversions will be the primary enduring measures used to address the gully erosion problems in the area.

Implementation will be accomplished through long-term contracts. The contracts will be between the SCS and the landowner. The owner or operator is responsible for operation and maintenance of the measures applied under the contract for the expected life of the measures. This expected life is stated in the contract.

The quality of the environment will be improved over time through the implementation of these contracts. The life of Trinidad Lake will be extended with project action. The quality of the water entering Trinidad Lake will also be improved through the project. The long-term productivity of the resource base will be maintained through the reduction of erosion damages. These effects coincide with the sponsors' goals.

## Purpose and Summary

This section of the document will explain the plan elements, costs, installation, financing, operation, and maintenance. The primary purpose of this land treatment plan is to reduce the amount of sediment entering Trinidad Lake. A secondary purpose is to provide protection to the resource base in the watershed.

## Plan Elements

The current programs available to address conservation concerns within the watershed will remain functional. This project's actions will supplement, not replace, on-going activities. All landowners and operators wishing to participate in this project may, unless their land already is involved in an existing contractual program. It is the landowner's or operator's decision as to which treatment measures to implement.

The technical assistance is distributed between planning, education/training, implementation, and follow-up. Long-term contracts will be the vehicle used to accomplish implementation. An estimated two staff years is necessary for developing conservation plans. Implementation will require approximately

five staff years. The follow-up will create a need for an estimated three and one-half staff years.

The educational component will be developed by the sponsors. It will be carried out through a cooperative effort between the Soil Conservation District, SCS, and Colorado Cooperative Extension Service (CE).

Financial assistance, as it relates to planned practice extents, can be derived from Table 1.

After the project action is complete, some erosion will still occur on the treated area; however, it will be at a significantly lower rate. The tons of soil erosion within the watershed is expected to be reduced to 128,700 tons (66 Ac. Ft.) annually. Trinidad Lake active storage loss due to sediment will be reduced by 104 acre feet per year. An improvement in the recreational value of Trinidad Lake is expected due to decreased silt loading. The on-site sediment damage should be significantly reduced.

The practices identified in Table 1 are those which will be cost-shared. Practices providing the same amount or greater protection of the environment may be used. The financial assistance, however, will not exceed that which is available for practices treating the same concern found in Table 1.

Assistance for practice application is available throughout the watershed. It is anticipated that critical area treatment will be carried out as a part of the construction of sediment basins and diversions and adjacent to water courses. Sediment basins and grade stabilization structures will be constructed on sites with severe gully erosion. Planned grazing systems will be included in all plans where livestock is involved. Brush management will be carried out when the amount of undesirable brush species exceeds the amount specified in the SCS Standard & Specification numbered 314 (Brush Management). Fences will be constructed to facilitate better grazing land management within property boundaries, but not as property boundaries. Water developments and pipelines will be constructed to facilitate better grazing land management. Financial assistance will be provided on the state-owned land in the watershed, if the cooperator has a lease on the land for the duration of the contract.

The sediment basins will be constructed with three types of materials. These materials include: earth, rock, and posts with wire. Brush management can be accomplished through one or a combination of the following methods: chemical, mechanical, or prescribed burns. SCS personnel can be involved in all phases of planning for prescribed burns, but cannot participate in the actual burn. Prescribed burning, however, will not be cost-shared.

include: 61,840 acres of rangeland, 575 acres of irrigated pasture and hayland, 740 acres of dry pasture and hayland, 12,806 acres of woodland, 6,716 acres of wildlife land, and 28,490 acres of other land. The other land includes development tracts of 35 or more acres for housing . Measures are expected to be applied to approximately 75 percent of the acres needing treatment.

Assistance under this project can only be provided under certain conditions. The assistance must address a concern identified by the sponsors and it must not result in long-term negative impacts to the environment without mitigation.

### Permits and Compliance

It is not anticipated that any federal permits or formal landrights will be needed to install the project. In the event that landrights or permits become necessary, the responsibility to acquire these items will rest with the project sponsors.

### Costs

The total cost of the project which includes both federal and local money is \$1,528,400 . The following table itemizes the costs by measure. Those measures showing no cost will not be cost-shared under this project. Table 1 displays how the costs of each measure are shared between federal and local dollars.

**MEASURE COSTS**  
**Trinidad Lake North Watershed**

Practice number and name	Unit	Extent	Cost
314 Brush Management	Ac.	300	\$3,600
342 Critical Area planting	Ac.	478	\$225,000
350E Sediment Basin (earthen)	No.	203	\$345,500
350R Sediment Basin (rock)	No.	748	\$149,600
350P Sediment Basin (post)	No.	161	\$32,200
362 Diversion	L.F.	5,372	\$24,500
378 Pond	No.	6	\$19,200
382 Fencing	Mi.	30	\$42,770
410 Grade Stabilization structure	No.	6	\$25,000
510 Pasture & Hayland Management	Ac.	555	\$0
512 Pasture & Hayland Planting	Ac.	400	\$26,000
516 Pipeline	L.F.	66,166	\$49,630
528 Proper Grazing Use	Ac.	46,380	\$0
530 Proper Woodland Grazing	Ac.	10,430	\$0
550 Range Seeding	Ac.	310	\$20,150
556 Planned Grazing System	Ac.	46,380	\$0
561 Heavy use area protection	Ac.	10	\$0
574 Spring Development	No.	6	\$12,000
614 Trough or Tank	No.	33	\$13,200
642 Well	No.	4	\$21,600
<u>Special Emphasis Measures</u>			
352 Deferred Grazing	Ac.	46,935	\$70,400



The estimated technical assistance costs for the above measures are \$397,800. This assistance will be in the form of education, planning, designing, and follow-up. The cost for this assistance is borne by the SCS. Project administration costs are estimated to be \$50,200 of which \$44,200 is federal and \$6,000 is local. This local cost is borne by the local Soil Conservation Districts.

One of the key factors to meeting the objective of the plan is the implementation of planned grazing systems. An integral part of these systems is the deferred grazing component. Deferred grazing is currently not being practiced in the watershed for a variety of reasons, most of which are economic in nature.

Deferred grazing means leaving a pasture idle and most ranchers need all of their land in production to feed their animals. Leaving a pasture idle would require buying feed that most of these ranchers cannot afford. The large percentage of minority and low income producers are even less able to buy additional feed than the other ranchers in the watershed. They need an incentive payment on deferred grazing to allow them to purchase feed that will make up for the short-term loss in production.

Most of the ranchers recognize the long-term benefits they will accrue in terms of production increase by implementing deferred grazing. However, long-term benefits do not mean much if you went out of business in the interim. The incentive payment is needed to help them through the transition and allow the participation needed to reduce sheet and rill erosion on rangeland.

### **Installation and Financing**

Participation in the project is voluntary. Landowners or entities wishing to participate must submit an application to enter into a contract with the SCS. The application must contain a legal description of the property to be considered for the contract. A copy of an affidavit which indicates the individual or entity has control over the land which would be involved in the contract. If a lease is used, it should indicate the terms and length. The Soil Conservation District (SCD) and SCS will determine the eligibility of an individual or entity to enter into a contract. They will also review the applications and set priorities for approval based on the concerns of the sponsors.

During the first three years of the project the educational component of the "Technical Assistance" will be implemented. Workshops are the chosen method of implementation. These workshops will present resource management concepts, methods, and technologies.



Workshops are the chosen method of implementation. These workshops will present resource management concepts, methods, and technologies.

Contractees will be strongly encouraged to participate in a workshop as a prerequisite for receiving PL-566 cost-share funds for deferred grazing. SCS will certify landowner or entity participation.

The SCS, at the request of the Purgatoire River SCD and the Spanish Peaks SCD, will be responsible for certifying installation of land treatment practices, providing follow-up assistance for operating and maintaining practices, administering and writing the land treatment contracts, and providing technical service. The plans will be written in accordance with the guidelines found in the National Conservation Planning Manual and the National Long-term Contracting Manual. Resource management systems will be installed by landowners who enter into Long-term Land Treatment Contracts with the SCS.

It is anticipated that funds will be obligated for an expected 80 contracts in the first three years of the project. Contract implementation will begin as soon as the contracts are approved. The contracts will expire two years after the last cost-shared item has been completed. The last two years of the contracts are used to insure the continuation of the required management practices.

A schedule that outlines a logical sequence of work to be accomplished within a reasonable time will be developed for each conservation plan. Some primary considerations in setting the time schedule are: the seasonal nature of practices; the inter-relationship of practices; the availability of contractors and materials; the landowner's financial situation; and the need for and availability of technical services. This will provide landusers the maximum time possible to finance their share of the project installation cost. These Conservation Plans of Operations (CPOs) will be developed detailing the kind and location of planned practices. CPOs will be reviewed and approved by the SCD prior to finalization of the contract by SCS and the participant. Contracts can be modified or revised as long as project objectives, as identified in this Watershed Plan, are achieved.

Cost-share payments are based on the average installation costs for that practice. A county average installation cost will be updated annually. All cost-share practices must be installed at least two years before the end of the contract, allowing two years of management, operation, and maintenance. Each landuser will be responsible for his/her share of the practice cost, from his/her own financial sources.

The practices will be installed by the landowner or through contractors, in accordance with SCS standards and specifications.

Assistance for planning, design, construction layout, and maintenance of practices will be provided by SCS.

The treatment expenditures for the project are those anticipated for installation, technical assistance, and administration of land treatment contracts. The SCS will assist the SCD(s) with the educational component of the technical assistance. The SCS will also provide the technical assistance to plan and design practices through the Purgatoire River and Spanish Peaks SCD(s). Costs associated with installation of practices will be borne in part by the SCS. SCS funds for technical and financial assistance will be contingent upon and obtained from an appropriation from the Watershed Protection and Flood Prevention Act (PL-566). Table D displays the planned sequence of obligating funds for the project.

### **Operation and Maintenance**

The guidelines for performing operation and maintenance which are included in the individual contracts are the contractee's responsibility to carry out. These functions must be carried out for the life of the contract. The sponsors and SCS personnel will make annual contract reviews to insure that contract items are being completed. Sponsors will encourage contract holders to operate and maintain measures for the expected life of the measures through letters and meetings with contractees. The operation and maintenance costs are expected to be approximately \$29,400.

TABLE D - Schedule of Obligation (s)  
Trinidad Lake North Watershed, Colorado

Year	Item	FL-566 Funds	Other Funds	Total Funds
1	Financial Assistance	\$181,600	\$88,400	\$270,000
	Technical Assistance	\$22,800	\$0	\$22,800
	Administration	\$8,900	\$2,200	\$11,100
2	Financial Assistance	\$272,800	\$132,600	\$405,400
	Technical Assistance	\$45,000	\$0	\$45,000
	Administration	\$8,800	\$1,800	\$10,600
3	Financial Assistance	\$272,500	\$132,500	\$405,000
	Technical Assistance	\$66,600	\$0	\$66,600
	Administration	\$8,800	\$1,000	\$9,800
4	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$54,600	\$0	\$54,600
	Administration	\$3,000	\$200	\$3,200
5	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$54,600	\$0	\$54,600
	Administration	\$2,900	\$200	\$3,100
6	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$54,600	\$0	\$54,600
	Administration	\$2,900	\$0	\$2,900
7	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$45,300	\$0	\$45,300
	Administration	\$2,900	\$200	\$3,100
8	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$32,600	\$0	\$32,600
	Administration	\$2,900	\$200	\$3,100
9	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$14,500	\$0	\$14,500
	Administration	\$1,600	\$100	\$1,700
10	Financial Assistance	\$0	\$0	\$0
	Technical Assistance	\$7,200	\$0	\$7,200
	Administration	\$1,500	\$100	\$1,600
Totals				
	Financial Assistance	\$726,900	\$353,500	\$1,080,400
	Technical Assistance	\$397,800	\$0	\$397,800
	Administration	\$44,200	\$6,000	\$50,200
	Grand Total	\$1,168,900	\$359,500	\$1,528,400





TABLE 1 - ESTIMATED INSTALLATION COSTS  
Trinidad Lake North Watershed, Colorado

Installation Cost Item	Unit	Number	Estimated Cost (Dollars) 1/				Subtotal	Subtotal	TOTAL
			Public Law 83-566 Funds	Nonfederal Land	SFS 2/	Other Funds			
LAND TREATMENT - ACCELERATED									
Enduring Practices:									
Stockwater Development	No.	39	\$33,000				\$33,000	\$33,000	\$66,000
Fencing	Mi.	30	\$21,400				\$21,400	\$21,400	\$42,800
Brush Control	Ac.	300	\$1,800				\$1,800	\$1,800	\$3,600
Critical Area Planting	Ac.	478	\$155,000				\$155,000	\$155,000	\$225,000
Sediment Basin	No.	1112	\$363,300				\$363,300	\$363,300	\$527,300
Diversion	L.F.	5372	\$16,900				\$16,900	\$16,900	\$24,500
Grade Stabilization Structures	No.	6	\$17,200				\$17,200	\$17,200	\$25,000
Pasture & Hayland Planting	Ac.	400	\$13,000				\$13,000	\$13,000	\$26,000
Range Seeding	Ac.	310	\$10,100				\$10,100	\$10,100	\$20,200
Pipeline	L.F.	66166	\$24,800				\$24,800	\$24,800	\$49,600
Management Practices:									
Deferred Grazing	Ac.	46935	\$70,400				\$70,400	\$0	\$70,400
Technical Assistance			\$397,800				\$397,800	\$0	\$397,800
SUBTOTAL - ACCELERATED			\$1,124,700				\$1,124,700	\$353,500	\$1,478,200
SUBTOTAL LAND TREATMENT			\$1,124,700				\$1,124,700	\$353,500	\$1,478,200
ADMINISTRATION COSTS			\$44,200				\$44,200	\$6,000	\$50,200
TOTAL PROJECT			\$1,168,900				\$1,168,900	\$359,500	\$1,528,400

1/ Price Base 1991

2/ Federal agency responsible for assisting in installation of works of improvement.

March  
1992



TABLE 4 - ANNUALIZED ADVERSE NED EFFECTS  
 Trinidad Lake North Watershed, Colorado  
 (Dollars) 1/

	PROJECT OUTLAYS	OTHER PROJECT COSTS	
Evaluation Unit			
	Amortization of Operation, Maintenance, and Installation Cost	Other Direct Costs	Total
Land Treatment - ACC			
Watershed	\$152,500	\$29,400	\$181,900
GRAND TOTAL	\$152,500	\$29,400	\$181,900

1/ Price Base 1991 - Discounted and annualized at 3.75 percent rate  
 for 25 years (includes technical assistance/administrative costs)

March  
 1992





TABLE 5A - ESTIMATED ANNUALIZED WATERSHED PROTECTION  
DAMAGE REDUCTION BENEFITS  
Trinidad Lake North Watershed, Colorado  
Dollars 1/

Item	Estimated Annualized Damage	Without Project	With Project	Damage Reduction Benefit
On-site				
Maintaining productivity	\$242,600		\$189,600	\$53,000
Farm ponds & reservoirs	\$30,500		\$6,900	\$23,600
Fence damages	\$3,500		\$2,400	\$1,100
Subtotal	\$276,600		\$198,900	\$77,700
Off-site				
Sediment damages	\$168,300		\$62,900	\$105,400
Roads, bridges, & culverts	\$41,300		\$13,000	\$28,300
Subtotal	\$209,600		\$75,900	\$133,700
Grand Total	\$486,200		\$274,800	\$211,400

1/ Price Base 1991

March  
1992



TABLE 6 - COMPARISON OF NED BENEFITS AND COSTS  
Trinidad Lake North Watershed  
Las Animas County, Colorado  
Dollars 1/

Evaluation Unit	Agricultural	Other Economic Effects	Total Annualized Benefits	Annualized Costs 2/	Benefit Cost Ratio
LAND TREATMENT - ACC					
Erosion and Sediment Control	\$77,700	\$133,700	\$211,400	\$181,900	1.16:1.0
Total	\$77,700	\$133,700	\$211,400	\$181,900	1.16:1.0

1/ Price Base 1991

2/ From Table 4

March  
1992





## EFFECTS OF RECOMMENDED PLAN

### General Impacts

The effect of the project as it relates to the items in Table A, with a high degree of significance to decision making, is discussed in this section. The condition of the area without the project is indicated in Table B. Table D displays the effects of the Recommended Plan on the resources of principal national recognition.

### OFF-SITE EFFECTS

Sediment delivered to Trinidad Lake	104 Ac. Ft. or
will be reduced by	158,600 Tons
Water quality of Trinidad Lake	Improved
Trinidad Lake user days (anticipated)	Increase
Riparian habitat value	Increased
Watershed road safety	Improved
Watershed road maintenance	Reduced
Trinidad Lake - life	Lengthened
Annual economic benefit	\$133,700

### ON-SITE EFFECTS

Annual erosion reduction	104 Ac. Ft. or
	203,800 Tons
Road safety and quality of life	Improved
Water conservation on range	Increased
Area Animal Unit Month increase	6,400
Long-term productivity	Maintained
Riparian habitat value	Increased
Wildlife habitat value	Increased
Annual economic benefits	\$77,700
Farm ponds (life)	Lengthened

With the expected level of participation, a degree of water quality impairment will remain. Erosion from the participating agricultural units will continue, but be reduced, thus enhancing the condition of the resource base. No significant long-term negative effects on the existing wetlands are expected due to the project. No negative effects to endangered species are anticipated due to project action. Even though black footed ferrets are not known to exist in the area, care will be taken not to impact existing prairie dog towns which may provide habitat for them. Cultural resource sites which exist in the watershed will not be damaged by project action. In the event additional sites are identified that may be altered or damaged by project action, the Colorado Historic Preservation Office will be consulted so mitigation can be discussed and a consensus reached. The area's economy is significantly effected by outdoor recreational activities. Many of them are water based and

dependent on Trinidad Lake. Therefore, the area's economy should be positively impacted by this project. As the resource base is improved through project action, the land-based recreational environment is also improved. These improvements should also have a positive impact on the economy of the area due to increased use. Overall, a significant improvement of the environment is expected. The total cost of the project will be \$1,528,400. The average annual cost will be \$181,900.

#### **Relationship to Land and Water Plans, Policies, and Controls**

The Recommended Plan conforms and compliments plans, policies, and programs of the other agencies and organizations operating in the watershed area. The project is identified as a high priority item in the (SCD's) Long-Range Plan and as a priority watershed in the Non-point Source Management Program of Colorado. The cost-sharing of conservation practices associated with this plan compliments the on-going Agricultural Conservation Program and the Great Plains Conservation Program.

The federal agencies having financial or installation responsibilities in the implementation of this land treatment project are subject to the National Environmental Policy Act (NEPA) (Public Law 91-190) of 1969. The SCS is also subject to E.O. 11990, Protection of Wetlands, and policy found in Section 410.26 of the said agency's General Manual.

TABLE E - EFFECTS OF THE RECOMMENDED PLAN ON RESOURCES  
OF PRINCIPAL NATIONAL RECOGNITION  
Trinidad Lake North Watershed, Colorado

Type of Resources	Principal sources of National Recognition	Measurement of Effects
Air quality	Clean Air Act, as amended (42 U.S.C. 1857h-7, et seq.).	Dust in air from range and grazable woodland will be reduced significantly.
Area of particular concern within the coastal zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451, et seq.).	Not present in planning area.
Endangered and threatened species critical habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531, et seq.).	No effect.
Fish and wildlife habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661, et seq.).	57,000 Ac. of upland wildlife habitat improved.
Floodplains	Executive Order 11988, Floodplain Management.	Some channel stabilization through critical area plantings.
Historic & cultural properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. sec. Sec. 470, et seq.).	No effect.
Prime and unique farmland	CEQ Memorandum of August 1, 1980 Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act, Farmland Protection Policy Act of 1981.	Not present in planning area.
Water quality	Clean Water Act of 1977 (33 U.S.C. 1251, et seq.).	Sediment delivered to Trinidad Lake reduced by 104 Ac. Ft. per year. Possible associated salt reduction.
Wetlands	Executive Order 11990, Protection of Wetlands Clean Water Act of 1977. (42 U.S.C. 1857h-7, et seq.). Food Security Act of 1985.	No negative effects.
Wild and scenic rivers	Wild Scenic River Act, as amended (16 U.S.C. 1271, et seq.).	Not present in planning area.

The first part of the paper discusses the importance of the study and the objectives of the research. It highlights the need for a comprehensive understanding of the subject matter and the role of the researcher in this process. The second part of the paper presents the methodology used in the study, including the data collection methods and the analysis techniques. The third part of the paper discusses the results of the study and the conclusions drawn from the data. The fourth part of the paper discusses the implications of the study and the future research directions.

The study was conducted in a systematic and rigorous manner, following the principles of scientific research. The data was collected from a large sample of participants, and the results were analyzed using advanced statistical techniques. The findings of the study are presented in a clear and concise manner, and the conclusions are based on the evidence provided. The implications of the study are discussed in detail, and the future research directions are outlined.

The study has several strengths, including the use of a large sample size and the application of advanced statistical techniques. However, there are also some limitations to the study, such as the potential for bias in the data collection process. Despite these limitations, the study provides valuable insights into the subject matter and contributes to the existing body of knowledge.

In conclusion, the study is a significant contribution to the field and provides a comprehensive understanding of the subject matter. The findings of the study are presented in a clear and concise manner, and the conclusions are based on the evidence provided. The implications of the study are discussed in detail, and the future research directions are outlined.



## CONSULTATION AND PUBLIC PARTICIPATION

Several opportunities have been provided for public participation throughout the development of this plan. The following list provides more of the specific information regarding these meetings.

### November 1987:

Type of meeting - A meeting of the Colorado Association of Soil Conservation Districts was held.

Purpose - The Spanish Peaks SCD presented a resolution supporting the application for the North Trinidad Lake PL-566 Land Treatment Watershed project.

Participants - The SCDs of Colorado, the State Soil Conservation Board, and the SCS of Colorado.

### January 26, 1988:

Type of meeting - Potential Sponsor Meeting.

Purpose - To determine the interest in obtaining a planning start on the Trinidad Lake North project.

Participants - The City of Trinidad and the Purgatoire and Spanish Peaks SCDs.

### March 10, 1988:

Type of meeting - Public.

Purpose - To further investigate support for the project.

Participants - The Sangre de Cristo RC&D Council and the Council and the Purgatoire and Spanish Peaks SCDs.

### January 25, 1989:

Type of meeting - Report review

Purpose - Review the Preauthorization Report and get concurrence to request planning.

Participants - Sponsor representatives.

May 11, 1989:

Type of meeting - Plan review meeting.

Purpose - Review the plan of work.

Participants - Sponsor representatives and SCS staff.

June 1, 1989:

Type of meeting - Scoping meeting.

Purpose - To determine agency concerns.

Participants - U.S. Geological Survey, U.S. Corps of Engineers, Colorado Parks and Recreation, and the Colorado State Cooperative Extension Service.

August 29, 1989:

Type of meeting - Public.

Purpose - To determine landowner project interest.

Participants - Landowners in the area and SCD representatives.

October 30, 1990:

Type of meeting - Review meeting.

Purpose - Review alternative plans.

Participants - Sponsor representatives.

November 5, 1990:

Type of meeting - Review meeting.

Purpose - Review alternative plans.

Participants - Sponsor representatives.

February 21, 1991:

Type of meeting - Review meeting.

Purpose - Review draft plan.

Participants - Sponsor representatives.

January 29, 1992:

Type of meeting - Public.

Purpose - Review Interagency Draft Plan.

Participants - Public and government representatives.

Review and comments were requested from the following agencies:

USDA - Agricultural Stabilization and Conservation Service  
Colorado Cooperative Extension Service  
Farmers Home Administration  
Forest Service

USDI - Bureau of Land Management  
Fish and Wildlife Service  
Geological Survey

U.S. Environmental Protection Agency

U.S. Army - Corps of Engineers

Advisory Council on Historic Preservation

State of Colorado -  
Governor  
Division of Wildlife  
Heritage Center  
Water Conservation Board  
State Clearinghouse  
Division of Water Resources - State Engineer  
Department of Health

City of Trinidad

Las Animas County Commissioners

Spanish Peaks Soil Conservation District

Purgatoire River Soil Conservation District

Purgatoire River Conservancy District





## LIST OF PREPARERS

Name	Jim P. Thornton
Job Title	RB/WS Planning Staff Leader
Assignment	Coordinated Staff Activities
Education	BS, Agricultural Engineering, 1960
Experience	SCS engineer - 15 years River Basins/Watershed Staff Leader - 16 years P.E. Colorado and New Mexico

Name	Al Elkin (deceased 1989)
Job Title	Geologist
Assignment	Principal investigator for geology
Education	BA, Geology, 1948
Experience	SCS engineering geology in Colorado - 30 years

Name	S. Glade Wilkes
Job Title	Hydrologist
Assignment	Principal investigator for hydrology
Education	BS, Civil Engineering, 1957
Experience	SCS Hydrologic Engineer - 33 years

Name	Harry L. Smith
Job Title	Planning Engineer
Assignment	Principal investigator for engineering designs
Education	BS, Agriculture Engineering, 1965
Experience	SCS Engineer - 25 years, P.E. Texas

Name	Nyle L. Jordre
Job Title	Economist
Assignment	Principal investigator for economic evaluations
Education	MS, Agricultural Economics, 1967
Experience	SCS Economist - 24 years

Name	Tim Sweeney
Job Title	Resource Conservationist
Assignment	Formulate alternative plans
Education	BS, Natural Resource Management, 1974
Experience	SCS Soil Conservationist - 9 years SCS District Conservationist - 3 years Forestry Tech. (U.S. Army) 3 years

Name	Ken Lutz
Job Title	District Conservationist
Assignment	Coordinated local planning activities
Education	BS, Range Ecology, 1970
Experience	SCS Range Conservationist - 8 years SCS District Conservationist - 4 years Soil Conservationist (USFWS) - 1 year

Name	Bill Watson
Job Title	Past District Conservationist
Assignment	Coordinated initial activities
Experience	SCS Range Conservationist - 16 years SCS District Conservationist - 11 years

Name	Jim Hamilton
Job Title	Soil Conservationist
Assignment	Coordinated watershed inventories
Education	BS, Agriculture Education
Experience	SCS District Conservationist - 9 years SCS Soil Conservationist - 14 years

Name	Edward Schwille
Job Title	SCS Colorado State Biologist
Assignment	Conduct Environmental Evaluation
Education	BS, Wildlife Mgnt.
Experience	SCS Colorado State Biologist - 3 years SCS Area Biologist - 23 years SCS Soil Conservationist - 2 years

## APPENDICES

### Appendix A - Letters and Oral Comments

- . United States Fish and Wildlife Service - T&E Species
- . United States Fish and Wildlife Service - Interagency Review
- . Colorado Division of Local Government - State Clearinghouse
- . Colorado State Historic Information & Preservation Officer

### Appendix B - Support Maps

### Appendix C - Investigation and Analyses Report

### Appendix D - Supporting information

### Appendix E - Project Map





## APPENDIX A





# United States Department of the Interior



## FISH AND WILDLIFE SERVICE FISH AND WILDLIFE ENHANCEMENT

Colorado State Office  
730 Simms Street, Suite 290  
Golden, CO 80401

FWE/CO: SCS  
Mail Stop 65412  
JBG\*SCSENV2.WPF

Phone (303) 231-5280 FTS 554-5280  
FAX (303) 231-5285

JAN 17 1992

Duane L. Johnson  
State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
655 Parfet Street, Room E200C  
Lakewood, Colorado 80211-5517

RE: Review of Draft Environmental Assessment and Finding-Of-No-Significant-Impact Statement for the Proposed Trinidad Lake North Watershed Conservation Project in Las Animas County, Colorado.

Dear Mr. Johnson:

The U.S. Fish and Wildlife Service reviewed the subject documents and offers the following comments and recommendations.

After reviewing all the information presented in the subject project draft and provided the project is implemented as stated in the draft document, the Service concurs with your FONSI determination of "no affect" to threatened and endangered species.

If the Service can be of further assistance, please contact Bernardo Garza of this office at (303) 231-5280.

Sincerely,

LeRoy W. Carlson  
Colorado State Supervisor

cc: FWS/FWE; SLC  
CDOW, Colorado Springs, CO (Attn. Bruce Goforth)  
Reading file  
Project file

UNITED STATES  
DEPARTMENT  
AGRICULTURE

SOIL  
CONSERVATION  
SERVICE

ROOM E200C  
655 PARFET STREET  
LAKEWOOD, CO 80215-5517

April 22, 1991

Bill Noonan  
USF&WS - Enhancement  
730 Simms, Suite 290  
Golden, CO 80401

Dear Mr. Noonan:

The listing of T&E Species found in the Trinidad Lake North Watershed, Las Animas County, Colorado, was received from the US Fish & Wildlife Service by letter dated January 14, 1991. We have reviewed the data and studied the area and found that T&E Species would not be adversely affected. A copy of the draft watershed plan/EA is included for your review.

A letter of concurrence that we have adequately addressed T&E Species is requested.

For additional information, please contact Jim P. Thornton, RB/WS Planning Staff Leader, 236-2900.

Sincerely,

WKJ

DUANE L. JOHNSON  
State Conservationist

Enclosure

cc: Edward Schwille, Biologist, SCS, Lakewood, CO



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

COLORADO FIELD OFFICE

730 SIMMS STREET

ROOM 292

GOLDEN, COLORADO 80401

IN REPLY REFER TO:

FWE/CC: SCS

A:\SPPLIST9.WPF

JAN 14 1991

Duane L. Johnson, State Conservationist  
US Department of Agriculture, Soil Conservation Service  
655 Parfet Street, Room E200C  
Lakewood, Colorado 80211-5517

Dear Mr. Johnson:

In response to your letter of December 18, 1990, the U.S. Fish and Wildlife Service (Service) is providing the list of endangered and threatened (Federally listed) animal and plant species present, in Las Animas County in the State of Colorado. This information should be helpful in the preparation of the environmental evaluation for this project.

Mammals: Black-footed ferret (Mustela nigripes)

Birds: Peregrine falcon (Falco peregrinus)  
Bald eagle (Haliaeetus leucocephalus)  
Whooping crane (Grus americana)  
Piping plover (Charadrius melodus)  
Least tern (Sterna antillarum)

Historically, the black-footed ferret occurred throughout Colorado. Literature and recent field studies document a close association between prairie dogs and black-footed ferrets. The standard that is used by the Service for determining possible project effects to black-footed ferrets is the disturbance of currently occupied prairie dog habitat. Should any of the activities associated with this project result in an impact to prairie dogs, black-footed ferret surveys may be necessary. As black-footed ferret surveys are considered valid for 1 year, prairie dog towns surveyed more than 1 year prior to construction may have to be resurveyed.

Burrowing owls (Speotyto cunicularia) often occur in association with prairie dog colonies. Burrowing owls are a migratory species and, therefore, protected in accordance with the Migratory Bird Treaty Act (16 U.S.C. 701-718h). Migratory birds are considered to be any non-resident species that migrate across state and/or national boundaries. Protection prohibits the "taking" of birds, eggs, nests, parts or products. A "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Your proposed project should be designed and/or timed to ensure



that a "take" of burrowing owls will not occur.

The five listed bird species are potential migrants in the area of your project. The bald eagle and the peregrine falcon are the two species most likely to occur within the project area. The whooping crane, least tern and the piping plover are rare migrants in the project area. Severe weather in the Great Plains may force migrating birds west of normal flight paths.

The Service would like to bring to your attention species which are candidates for official listing as threatened or endangered species (Federal Register, Vol. 54, No. 4, January 6, 1989; Vol 55, No. 35, February 21, 1990). While these species presently have no legal protection under the Endangered Species Act (Act), it is within the spirit of the Act to consider project impacts to potentially sensitive candidate species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

Amphibians: Northern leopard frog (Rana pipiens)

Birds: Long-billed curlew (Numenius americanus)  
Mountain plover (Charadrius montanus)  
Black tern (Chlidonias niger)

Fishes: Arkansas darter (Etheostoma caeruleum)  
Speckled chub (Extrarius aestivalis tetranemus)

Mammals: Swift fox (Vulpes velox)  
Fringed-tailed myotis (Myotis thysanodes pahasapensis)

Plants: Colorado green gentian (Frasera coloradensis)  
Single-headed goldenweed (Haplopappus fremontii ssp. monocephalus)

Reptiles: Texas horned lizard (Phrynosoma cornutum)

We are also enclosing, for your information, a list of all the endangered, threatened and candidate species for the entire State as some of the species not listed for Las Animas County may occur in this area without the Service being aware of it.


Furthermore, the Service regards wetlands as an important resource due to their high value for fish and wildlife. Therefore, we recommend that the project area be inventoried for wetlands. Wetlands should be defined according to "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin, et al., 1977). Any adverse impacts to wetlands within the project influence need to be avoided (Section 404 of the Clean Water Act regulates the fill of wetlands on public and private land).

The information provided by your office did not contain enough detail as to the project description. This office would like to request more detailed explanation of your project(s) and a detailed definition of what you have termed "improvement of range management and control the erosion" to be used to determine if the activities associated with this project would have an adverse effect on any of the previously mentioned species or waters of the United States.

If the Service can be of further assistance, please contact Bernardo Garza of this office at (303) 231-5280.

Sincerely,



 LeRoy W. Carlson  
Colorado State Supervisor

Enclosures

cc: FWS/FWE; SLC  
FWS/FWE; Grand Junction  
CDOW, Colorado Springs, CO (Attn. Bruce Goforth)  
Reading file  
Project file

U.S. FISH AND WILDLIFE SERVICE LIST OF ENDANGERED,  
THREATENED AND CANDIDATE SPECIES FOR THE STATE OF COLORADO

compiled  
11/30/90

TYPE OF SPECIES	SPECIES COMMON AND SCIENTIFIC NAME	CATEGORY
Amphibians	Wyoming toad, <i>Bufo hemiophrys baxteri</i>	LE
Amphibians	Northern leopard frog, <i>Rana pipiens</i>	2
Amphibians	Boreal western toad, <i>Bufo boreas boreas</i>	2
Birds	American peregrine falcon, <i>Falco peregrinus anatum</i>	LE
Birds	Arctic peregrine falcon, <i>Falco peregrinus tundrius</i>	LT
Birds	Whooping crane, <i>Grus americana</i>	LE
Birds	Southwestern willow flycatcher, <i>Empidonax traillii extimus</i>	2
Birds	Western yellow-billed cuckoo, <i>Coccyzus americanus occidentalis</i>	3B
Birds	Swainson's hawk, <i>Buteo swainsoni</i>	3C
Birds	White-faced ibis, <i>Plegadis chihi</i>	2
Birds	Mexican spotted owl, <i>Strix occidentalis lucida</i>	2
Birds	Columbian sharp-tailed grouse, <i>Tympanuchus phasianellus columbianus</i>	2
Birds	Western snowy plover, <i>Charadrius alexandrinus nivosus</i>	2
Birds	Mountain plover, <i>Charadrius montanus</i>	2
Birds	Piping plover, <i>Charadrius melodus</i>	LT
Birds	Long-billed curlew, <i>Numenius americanus</i>	2
Birds	Ferruginous hawk, <i>Buteo regalis</i>	2
Birds	Harlequin duck, <i>Histrionicus histrionicus</i>	2
Birds	Black tern, <i>Chlidonias niger</i>	2
Birds	Least tern (interior population), <i>Sterna antillarum</i>	LE
Birds	Eskimo curlew, <i>Numenius borealis</i>	LE
Birds	Bald eagle, <i>Haliaeetus leucocephalus</i>	LE
Butterflies	Pawnee montane skipper, <i>Hesperia leonardus montana</i>	LT
Butterflies	Uncompahgre fritillary butterfly, <i>Boloria acrocnema</i>	1
Butterflies	Stevens' tortricid moth, <i>Decodes stenseni</i>	2
Butterflies	Mountain silverspot butterfly, <i>Speyeria nokomis nitocris</i>	3C
Butterflies	Great basin silverspot butterfly, <i>Speyeria nokomis nokomis</i>	2
Butterflies	Weist's sphinx moth, <i>Euproserpinus wiesti</i>	3C
Butterflies	Lost ethmid moth, <i>Ethmia monachella</i>	2
Butterflies	Albarufan dagger moth, <i>Acronicta albarufa</i>	2
Butterflies	Alamosa satyr butterfly, <i>Cercyonis meadi alamosa</i>	3C
Butterflies	Smoky eyed brown butterfly, <i>Satyroides eurydice fumosa</i>	3C
Butterflies	Regal fritillary butterfly, <i>Speyeria idalia</i>	2
Butterflies	Hydaspe fritillary butterfly, <i>Speyeria hydaspe conquista</i>	3B
Fishes	Arkansas darter, <i>Etheostoma cragini</i>	2
Fishes	Razorback sucker, <i>Xyrauchen texanus</i>	1
Fishes	Greenback cutthroat trout, <i>Salmo clarki stomias</i>	LT
Fishes	Rio Grande cutthroat trout, <i>Oncorhynchus clarki virginalis</i>	3C
Fishes	Colorado cutthroat trout, <i>Salmo clarki pleuriticus</i>	2
Fishes	Speckled chub (Arkansas River Basin pop), <i>Extrarius aestivalis tetranemus</i>	1
Fishes	Plains topminnow, <i>Fundulus sciadicus</i>	2
Fishes	Banded killifish, <i>Fundulus diaphanus</i>	2
Fishes	Round tail chub, <i>Gila robusta</i>	2
Fishes	Colorado squawfish, <i>Ptychocheilus lucius</i>	LE
Fishes	Bonytail chub, <i>Gila elegans</i>	LE
Fishes	Humpback chub, <i>Gila cypha</i>	LE
Mammals	Colorado hog-nosed skunk, <i>Conepatus mesoleucus figginsi</i>	2
Mammals	Fringed-tailed myotis, <i>Myotis thysanodes pahasapensis</i>	2
Mammals	Swift fox, <i>Vulpes velox</i>	2
Mammals	Southwestern otter, <i>Lutra canadensis sonora</i>	2
Mammals	North American lynx, <i>Felis lynx canadensis</i>	2
Mammals	Preble's meadow jumping mouse, <i>Zapus hudsonius preblei</i>	2



U.S. FISH AND WILDLIFE SERVICE LIST OF ENDANGERED,  
THREATENED AND CANDIDATE SPECIES FOR THE STATE OF COLORADO

compiled  
11/30/90

TYPE OF SPECIES	SPECIES COMMON AND SCIENTIFIC NAME	CATEGORY
Mammals	Wet Mountains yellow-bellied marmot, <i>Marmota flaviventris</i> notioros	2
Mammals	Spotted bat, <i>Euderma maculatum</i>	2
Mammals	North American wolverine, <i>Gulo gulo luscus</i>	2
Mammals	Black-footed ferret, <i>Mustela nigripes</i>	LE
Mayflies	Colorado burrowing mayfly, <i>Ephemera compar</i>	2*
Plants	Clay-loving wild buckwheat, <i>Eriogonum pelinophilum</i>	LE
Plants	Ripley milk-vetch, <i>Astragalus ripleyi</i>	2
Plants	Knowlton's cactus, <i>Pediocactus knowltonii</i>	LE
Plants	Mancos milk-vetch, <i>Astragalus humillimus</i>	LE
Plants	Mesa verde cactus, <i>Sclerocactus mesae-verdae</i>	LT
Plants	North Park phacelia, <i>Phacelia formosula</i>	LE
Plants	Spineless hedgehog cactus, <i>Echinocereus triglochidiatus</i> var. inermis	LE
Plants	Osterhout milk-vetch, <i>Astragalus osterhoutii</i>	LE
Plants	Penland beardtongue, <i>Penstemon penlandii</i>	LE
Plants	Uinta Basin hookless cactus, <i>Sclerocactus glaucus</i>	LT
Plants	Skiff milk-vetch, <i>Astragalus microcymbus</i>	2
Plants	Royal Gorge stickleaf, <i>Mentzelia densa</i>	2
Plants	Colorado butterflyweed, <i>Gaura neomexicana</i> ssp. <i>coloradensis</i>	1
Plants	Weber monkey-flower, <i>Mimulus gemmiparus</i>	2
Plants	Graham beardtongue, <i>Penstemon grahamii</i>	1
Plants	Narrow-leaf evening-primrose, <i>Oenothera acutissima</i>	3C
Plants	Larimer aletes, <i>Aletes humilis</i>	2
Plants	Wolf Creek evening-primrose (Klein's evening-primrose), <i>Oenothera kleinii</i>	2*
Plants	Streaked ragweed, <i>Ambrosia linearis</i>	2
Plants	Roundleaf four-o'clock, <i>Oxybaphus rotundifolius</i> ( <i>Mirabilis</i> <i>rotundifolius</i> )	2
Plants	Cronquist milk-vetch, <i>Astragalus cronquistii</i>	2
Plants	Arkansas River feverfew, <i>Parthenium tetraeuris</i>	2
Plants	Hamilton milk-vetch, <i>Astragalus hamiltonii</i>	2
Plants	Degener beardtongue, <i>Penstemon degeneri</i>	2
Plants	Schmoll milk-vetch, <i>Astragalus schmolliae</i>	2
Plants	Grand Junction milk-vetch, <i>Astragalus linifolius</i>	3C
Plants	Mancos saltbrush, <i>Atriplex pleiantha</i>	2
Plants	Alpine braya, <i>Braya humilis</i> ssp. <i>ventosa</i>	3B
Plants	Gibbens beardtongue, <i>Penstemon gibbensii</i>	2
Plants	Slender spiderflower, <i>Cleome multicaulis</i>	2
Plants	Harrington beardtongue, <i>Penstemon harringtonii</i>	2
Plants	Kachina daisy, <i>Erigeron kachinensis</i>	2
Plants	Small-flower beardtongue, <i>Penstemon parviflorus</i>	2*
Plants	Utah fescue (Sedge fescue), <i>Festuca dasyclada</i>	3C
Plants	Debeque phacelia, <i>Phacelia submutica</i>	1
Plants	Colorado green gentian, <i>Frasera coloradensis</i>	2
Plants	Pagosa phlox, <i>Phlox caryophylla</i>	3C
Plants	Intermountain bitterweed, <i>Hymenoxys helenioides</i>	3B
Plants	Bell's twinpod, <i>Physaria bellii</i>	2
Plants	Dudley bluffs bladderpod, <i>Lesquerella congesta</i>	LT
Plants	Piceance twinpod (Dudley Bluffs twinpod), <i>Physaria obcordata</i>	LT
Plants	Pagosa bladderpod, <i>Lesquerella pruinosa</i>	2
Plants	Rocky Mountain cinquefoil (Front Range), <i>Potentilla effusa</i> var. <i>rupinicola</i>	2
Plants	Canyonlands lomatium (Slickrock desert parsley), <i>Lomatium</i>	2

U.S. FISH AND WILDLIFE SERVICE LIST OF ENDANGERED,  
THREATENED AND CANDIDATE SPECIES FOR THE STATE OF COLORADO

compiled  
11/30/90

TYPE OF SPECIES	SPECIES COMMON AND SCIENTIFIC NAME	CATEGORY
	latilobum	
Plants	Porter's feathergrass (Porter's needle grass), Ptilagrostis porteri (Ptilagrostis mongholica ssp. porteri)	2
Plants	Dolores skeletonplant (Dolores desert pink), Lygodesmia doloresensis	2
Plants	Colorado watercress (San Luis watercress), Rorippa coloradensis	2*
Plants	White River penstemon, Penstemon albifluvis	1
Plants	Different groundsel (Intermediate groundsel), Senecio dimorphophyllus var. intermedius	3C
Plants	Diluvium lady's tresses (Plateau lady's tresses), Spiranthes diluvialis	1
Plants	Debeque milk-vetch, Astragalus debequaeus	2
Plants	Sun-loving meadowrue, Thalictrum heliophilum	3C
Plants	Ownbey's thistle, Cirsium ownbeyi	2
Plants	NCN, Arabis sp. nov. /ined. (Arabis vivariensis)	S
Plants	Brandegge wild buckwheat, Eriogonum brandegei	1
Plants	Coaltown sagebrush, Artemisia argilosa	3B
Plants	Single-head goldenweed, Haplopappus fremontii ssp. monocephalus	2
Plants	NCN, Asplenium andrewsii	3B
Plants	Piceance bladderpod, Lesquerella parviflora	3C
Plants	San Pitch Valley milk-vetch, Astragalus lentiginosus var. chartaceus	2
Plants	Payson lupine, Lupinus crassus	2
Plants	Tiger beardtongue, Penstemon meibarium	2
Plants	Adobe beardtongue, Penstemon retrorsus	1
Plants	Wetherill milk-vetch, Astragalus wetherillii	2
Plants	Pale blue-eyed grass, Sisyrinchium pallidum	2
Plants	Penland eutrema, Eutrema penlandii	1
Plants	Hall fescue, Festuca hallii	3C
Plants	NCN, Habenaria zothecina	2
Plants	Colorado desert parsley (Adobe desert parsley), Lomatium concinnum	2
Plants	Mancos columbine, Aquilegia micrantha var. mancosana	2*
Plants	Grand Junction catseye, Cryptantha aperta	2*
Plants	Pagosa gilia, Ipomopsis polyantha var. polyantha	2
Plants	Arapien stickleaf, Mentzelia argillosa	3C
Plants	Mesa Verde stickleaf, Hackelia gracilentia	2
Plants	NCN, Hymenoxys lapidicola	2
Plants	NCN, Lesquerella condensata	2
Plants	NCN, Neoparrya lithophila	3C
Plants	Parachute beardtongue, Penstemon debilis	2
Reptiles	Texas horned lizard, Phrynosoma cornutum	2
Snails	Rocky Mountain capshell, Acroloxus coloradensis	2
Snails	Fragile ancyled, Ferrissia fragilis	2



UNITED STATES  
DEPARTMENT OF  
AGRICULTURE

SOIL  
CONSERVATION  
SERVICE

ROOM 22000  
655 PARFET STREET  
LAKEWOOD, CO 80211-5517

December 18, 1990

LeRoy W. Carlson  
Colorado State Supervisor  
U.S. Fish and Wildlife Service  
730 Simms Street, Rm 292  
Golden, CO 80401

Dear Mr. Carlson:

The Soil Conservation Service is assisting the Spanish Peaks Soil Conservation District, Purgatoire River Soil Conservation District, Purgatoire River Conservancy District, Las Animas County, City of Trinidad, and the Colorado State Soil Conservation Board to plan a proposed land treatment project under the Watershed Protection and Flood Prevention Program.

Trinidad Lake North Watershed (Location Map attached) is located in Las Animas County, Colorado. The expected impact area is north of the Purgatoire River upstream of the Trinidad Lake. The proposed project includes land treatment practices to improve the range management and control the erosion in the watershed.

As part of the environmental evaluation of this project, I am requesting that your office provide us with information on listed and proposed-to-be-listed threatened and endangered species that may occur in the area. This request is in compliance with the Endangered Species Act.

Sincerely,



DUANE L. JOHNSON  
State Conservationist

Attachment



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

COLORADO FIELD OFFICE

730 SIMMS STREET

ROOM 292

GOLDEN, COLORADO 80401

IN REPLY REFER TO:

FWE/CO: SCS  
Mail Stop 65412  
A:\SCSENV1.WPF

Duane L. Johnson, State Conservationist  
US Department of Agriculture, Soil Conservation Service  
655 Parfet Street, Room E200C  
Lakewood, Colorado 80211-5517

RE: Review of Draft Environmental Assessment for the Proposed  
Trinidad Lake North Watershed Conservation Project in Las  
Animas County, Colorado.

Dear Mr. Johnson:

The U.S. Fish and Wildlife Service (Service) has reviewed the  
subject Watershed Plan and Environmental Assessment (EA) and  
offers the following comments and recommendations.

Your EA mentioned that "Prairie dog towns, as potential habitat  
for the black-footed ferret, are widely distributed throughout  
the watershed." And later on your EA mentioned that "None of  
these species (black-footed ferret included) are known to exist  
in the watershed area at this time." If there are extensive  
prairie dog colonies in the area of the project, there is a  
possibility that black-footed ferrets may still exist in this  
region of the state.

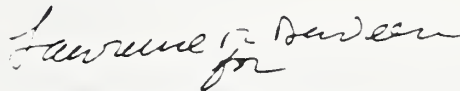
You have expressed that no ferrets are known to exist in the  
project area, probably because none has been seen by the  
residents of the area. Nevertheless, before the Service can  
conclude that black-footed ferrets do not exist at this location,  
or will not be harmed by the operations needed to implement the  
Watershed Plan, it requires assurance that no prairie dog  
colonies will be disturbed by the operations. A similar  
situation to yours existed in Meeteetsee, Wyoming where the last  
wild black-footed ferrets were found. Residents of the area had  
not seen the ferret due to its nocturnal and secretive behavior.  
It took an alert dog to find and capture one during the late  
hours of the night.

Provided that your agency coordinates with this office regarding  
impacts to prairie dog colonies in the area of this project, we  
concur with your "no effect" determination. Further provided  
that you coordinate with the Environmental Protection Agency on  
the effects of the project on wetlands and riparian habitats, the

Service does not oppose to the implementation of the proposed Watershed Plan.

If the Service can be of further assistance, please contact Bernardo Garza of this office at (303) 231-5280.

Sincerely,

A handwritten signature in cursive script, appearing to read "LeRoy W. Carlson".

LeRoy W. Carlson  
Colorado State Supervisor

cc: FWS/FWE; SLC  
FWS/FWE; Grand Junction  
CDOW, Colorado Springs, CO (Attn. Bruce Goforth)  
Reading file  
Project file

# STATE OF COLORADO

## DIVISION OF LOCAL GOVERNMENT

Harold A. Knott, Director

Department of Local Affairs



Roy Komer  
Governor  
Larry Kallenberger  
Executive  
Director

February 11, 1992

Mr. Duane L. Johnson  
State Conservationist  
USDA Soil Conservation Service  
655 Parfet Street, Room E200C  
Lakewood, CO 80215-5517

SUBJECT: Trinidad Lake North Watershed  
Watershed Plan, Environmental Assessment, and  
Finding of No Significant Impact

Dear Mr. Johnson:

The Colorado State Clearinghouse has received the above-referenced Watershed Plan, Environmental Assessment, and Finding of No Significant Impact and has notified interested state agencies. No comments have been received as of this date. However, should there be any late comments, we will forward them to you for your information.

Thank you for the opportunity to review this matter.

Sincerely,

*Margaret Dubas*

Margaret Dubas, Staff Assistant  
Colorado State Clearinghouse

/md





COLORADO  
HISTORICAL  
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

January 2, 1992

Duane L. Johnson  
State Conservationist  
Soil Conservation Service  
655 Parfet Street, Rm. E200C  
Lakewood, CO 80215-5517

Re: Trinidad Lake North Watershed Plan/Environmental Assessment

Dear Mr. Johnson:

This office has reviewed the above documents and we have the following comments.

1. Where land altering activities are planned in areas that have not been previously disturbed, we recommend that cultural resource surveys be undertaken to determine if eligible sites will be impacted by construction. This is done in accordance with the Advisory Council regulations, 36 CFR 800, in consultation with this office.

2. If structures fifty years of age or older are within the area of potential effect, a determination of eligibility and effect must be completed in consultation with this office.

If we may be of further assistance please contact Jim Green at 866-4674.

Sincerely,



James E. Hartmann  
State Historic Preservation Officer

JEH/WJG

STATE OF COLORADO  
Roy Romer, Governor  
DEPARTMENT OF NATURAL RESOURCES  
**DIVISION OF WILDLIFE**  
AN EQUAL OPPORTUNITY EMPLOYER

Perry D. Olson, Director  
6060 Broadway  
Denver, Colorado 80216  
Telephone: (303) 297-1192

REFER TO



*For Wildlife—  
For People*

February 13, 1992

Mr. Duane L. Johnson  
State Conservationist  
USDA Soil Conservation Service  
655 Parfet Street, Rm. E200C  
Lakewood, Co. 80215

RE: Draft Trinidad Lake North Watershed Plan/Environmental  
Assessment

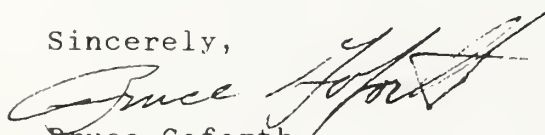
Dear Mr. Johnson:

The Colorado Division of Wildlife is supportive of the plan and feels its implementation will benefit terrestrial wildlife, both game and nongame, as well as fishery development in Trinidad Lake.

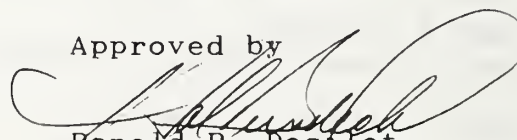
However, the Division recommends that there be closer coordination with our personnel in the Trinidad area to insure input regarding threatened and/or endangered species, construction of fences that may obstruct wildlife movements, and grazing practices. In each of these examples, Division personnel have knowledge of natural resource needs which would be valuable in decision making processes. Furthermore, the Division recommends that a formal information and education effort be made to address grazing practices, not only on large ranches, but on the 35 smaller properties. Local Division personnel would be happy to assist you in developing an educational program of this type.

If you have any questions regarding these comments, or if you would like to coordinate with our personnel as suggested, please call District Wildlife Manager, Bob Holder at 719-846-4834.

Sincerely,

  
Bruce Goforth  
Sr. Wildlife Biologist

Approved by

  
Ronald P. Desilet  
Regional Manager



REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 1580  
ALBUQUERQUE, NEW MEXICO 87103-1580  
FAX (505) 766-2770

February 20, 1992

Engineering and Planning Division  
Planning Branch

Mr. Duane L. Johnson  
State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
655 Parfet Street, Room E 200c  
Lakewood, Colorado 80215

Dear Mr. Johnson:

Thank you for giving us the chance to comment on the Draft Trinidad Lake North Watershed Plan/Environmental Assessment and Finding of No Significant Impact. We have reviewed your document and our comments are as follows:

a. The foreseen effects on the U.S Army Corps of Engineers, Albuquerque District, Trinidad Lake operating project by the proposed implementation of the selected alternative would result in no negative effects to the operating project. Implementation of this alternative would result in a reduction of sediment over time, between one and two years. Therefore, sedimentation problems will slowly diminish in the near future. We concur that the long range goals, purpose, and objectives are essential to enhance the longevity of the project and to increase and protect wildlife habitat. We appreciate and applaud this type of project, which produces a win-win situation for all involved.

b. We have no comments on this project from a hydro-logic perspective.

c. The Corps of Engineers has studied the project description and other records and documents available to us. A Section 404 Permit will not be required since no waters of the U.S. are involved.

Thank you for the opportunity to review the Draft Trinidad Lake North Watershed Plan/Environmental Assessment and Finding of No Significant Impact. If you have any questions or require additional information, please contact Mr. Andy Thoms of my staff at (505) 766-6569.

Sincerely,

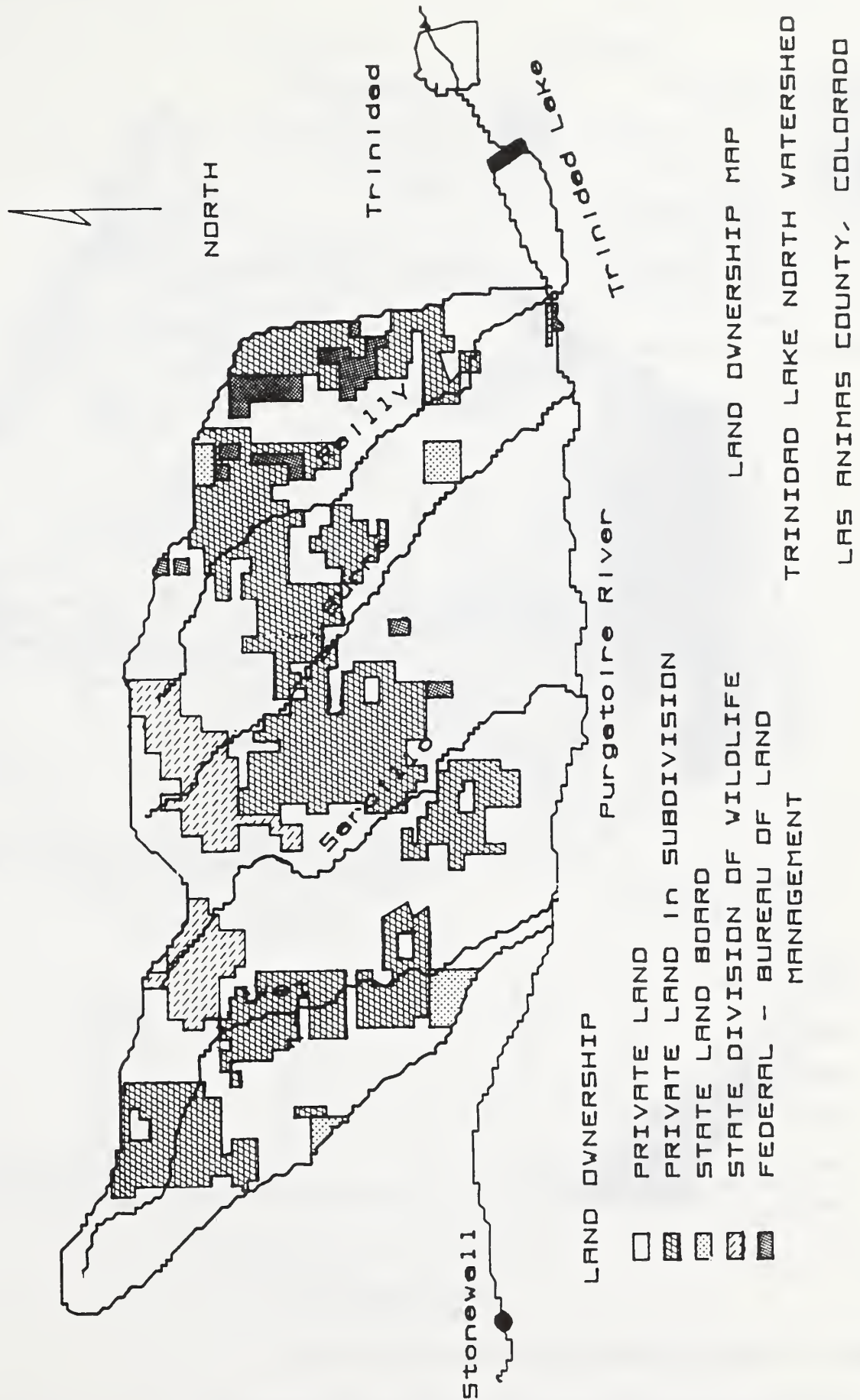
A handwritten signature in dark ink, appearing to read "G. Gamel", written over a faint circular stamp or watermark.

Gary L. Gamel, P.E.  
Chief, Engineering and Planning Division

## APPENDIX B







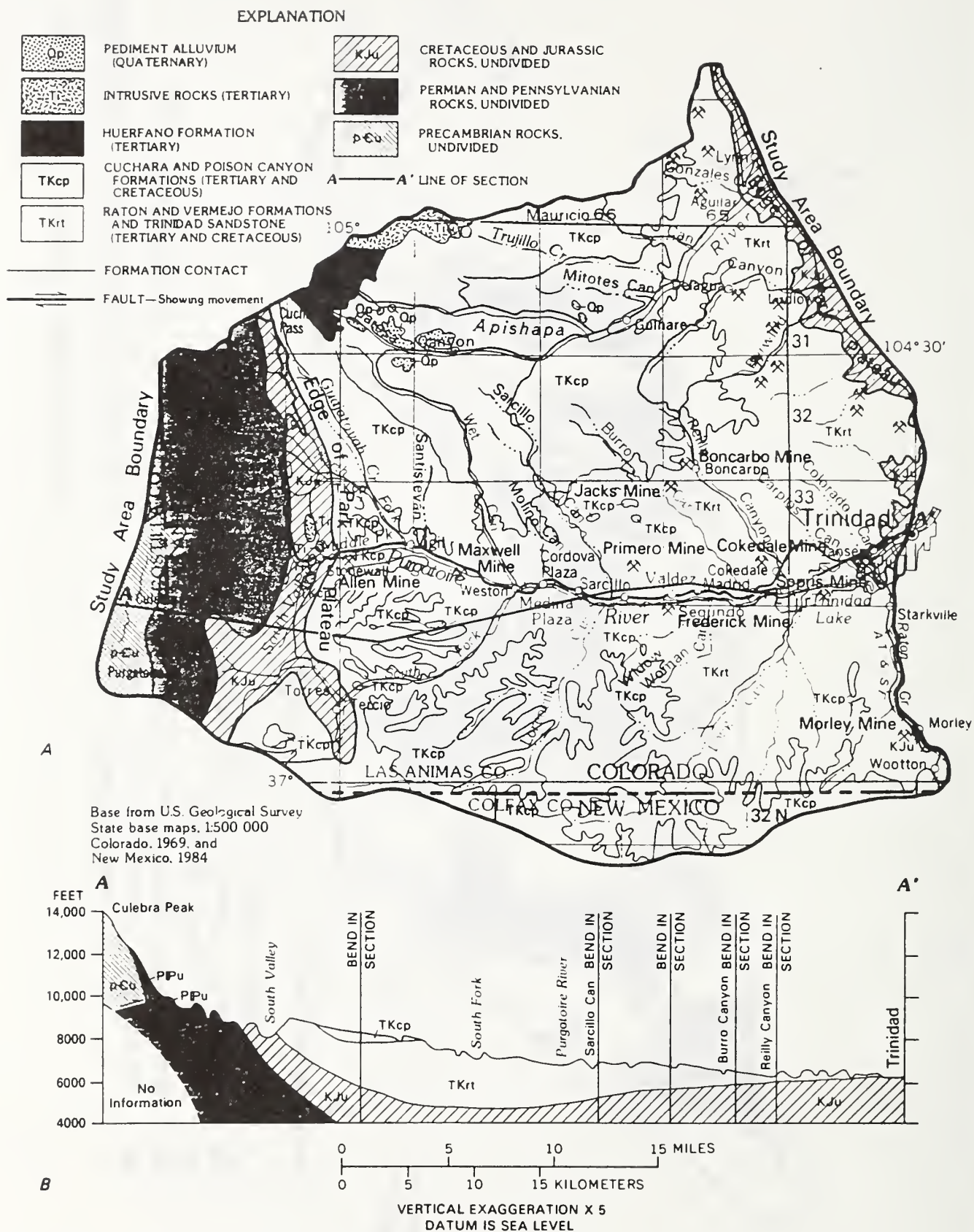


Figure 14. Geology of the central Raton Basin; A. Map; B. Cross section.

## APPENDIX C





## APPENDIX C

### INVESTIGATION AND ANALYSIS REPORT

#### PROJECT FORMULATION

The project was initiated by the Purgatoire and Spanish Peaks SCDs. Their request for assistance was directed to the SCS field office in Trinidad.

Land use in the project area consists of rangeland, irrigated and dry pasture land, grazeable woodland, and subdivision parcels of 35 acres or more. To conduct an inventory which would be representative of the area, SCS personnel decided to collect data on the majority of the larger ranching operations. A smaller data set was collected to represent the subdivided lands. The smaller data set was predominantly composed of grazeable woodlands and subdivided land. Field investigations were used to collect the data. Procedures found in the SCS Range Handbook were used during the range and grazeable woodland inventories. These two data sets were merged in the analysis.

The data collected consisted of: the resource conditions, the measures to be considered, and the extent of these measures needed to address the sponsors' concerns. The magnitude of the needs were derived by extrapolation of the inventoried data.

Based on the needs, alternative treatments were developed. The entire watershed was used as a treatment unit. Various levels of treatment were used as alternative plans. The effects of each alternative related to the sponsors' concerns were developed. Estimates of the effects of each practice within an alternative were made. These effects were extrapolated in the same fashion as the inventoried needs. The overall effect of an alternative was derived from these estimates as well as including an expected application factor. The draft watershed plan and environmental assessment was reviewed by state staff specialists having responsibility for engineering, soils, agronomy, range conservation, biology, forestry, economics, and geology. The sponsors selected an alternative which is the recommended plan.

#### ENVIRONMENTAL CONSIDERATIONS

Field inventories were carried out on approximately 78 percent of the project area. After they were completed, an Environmental Assessment was made for each alternative. Based on these evaluations, it was determined that an Environmental Impact Statement was not needed.

## CULTURAL RESOURCES

The Colorado State Historic Preservation Office was provided legal descriptions of the project area and asked to identify sites of significance to the state or nation which lie within the project area. The sites identified by the State Historic Preservation Office were noted in the plan. A contingency statement was placed in the plan identifying the steps to be taken if additional sites were located during the project.

## LAND USE

The watershed land use table in Appendix D identifies the present land uses in the project area and the associated acres. There are no expected changes in these acres due to project action.

## BIOLOGY

Information regarding the vegetation, range, and wildlife in the watershed were obtained by gathering and analyzing field data, as well as consulting with people familiar with the area. The U.S. Fish and Wildlife Service was asked to comment with regard to the presence of threatened and endangered species in the project area. The concern was raised that existing prairie dog towns, which could provide habitat for the black footed ferret, would be destroyed. The proposed land treatment practices will not impact existing prairie dog towns. Care will be taken to avoid these areas. The SCS state biologist made an on-site investigation of the area as well. The Environmental Assessment which was conducted did not identify any significant long-term negative impacts due to the proposed project. Therefore, an Environmental Impact Statement was not developed. However, an Environmental Assessment report was developed.

## GEOLOGY

Some of the geological information for the area was obtained from the paper numbered 2288, which was published by the United States Geological Survey in 1989.

The SCS state geologist conducted an on-site investigation of the entire watershed to determine the location and extent of sheet, rill, and gully erosion. The erosion rates on various landforms and soil mapping units were made. These rates were used to make additional estimates where conditions were similar to the sites where the original rates were developed. This rate information was summarized to provide an erosion rate estimate for the watershed.

## WATER QUALITY

Past, present, and future sediment rates, delivery ratios, and trap efficiencies were developed by the Colorado SCS state geologist to estimate the effect of sedimentation on Trinidad Lake. Sedimentation studies conducted by the U.S. Army Corps of Engineers were reviewed by the SCS geologist. Sediment deposition data was also collected by the SCS during a period when the lake level was significantly lower than the designed storage level. Heavy metals are known to be transported from the project area to Trinidad Lake during sedimentation. Some of the sediments reaching Trinidad Lake are derived from saline parent material. Water quality benefits are obtained from reduced salts leaving the watershed and being transported downstream to the reservoir, but were not used in project justification. From this data, with and without treatment scenarios were developed for the reservoir.

## ECONOMICS

Damage investigations and evaluation methods described in the SCS Economics Handbook were then followed to evaluate damages from reservoir sedimentation. The benefits associated with the reservoir were derived from the reduction of sedimentation in the reservoir. The same procedure was used to obtain the benefits to farm ponds. The cost of Trinidad Lake when built was updated using the Engineering News Record.

Floodwater, sediment, and erosion damages to roads and fences were obtained from the county highway department and landowners in the area. Damage reduction benefits were obtained through the frequency method of analysis described in the SCS Economics Handbook for Water Resources for the without and with project conditions. The average annual damage was determined from the curves.

The carrying capacity of the rangeland has been degrading in the watershed. Carrying capacities for each range site were developed according to its condition. Data including site condition was gathered on approximately 86 percent of the rangeland in the watershed. For each alternative developed, the carrying capacities were reestimated for each range site. The effect of the change in carrying capacity was calculated by expanding the sampled data to the entire watershed. The difference in carrying capacity was then discounted and annualized to obtain benefits.

## PRICES

Current prices were used for non-crop, project installation, operation, and maintenance costs. Great Plains practice costs were used where possible and applicable. Engineering costs estimates were developed for the enduring practices.



#### PERIOD OF EVALUATION

A period of 25 years was used as being the expected useful life of the project. The interest rate for converting benefits, as well as federal and other costs, to a common time base and in discounting future benefits was 8.75 percent.

## APPENDIX D





**WATERSHED LANDUSE**

Rangeland	-	61,800 Acres
Irrigated Pastureland	-	600 Acres
Dryland Pasture	-	700 Acres
Grazable Woodland	-	12,800 Acres
Wildlife Land	-	6,700 Acres
Other Land	-	28,500 Acres _1/
Total	-	111,100 Acres

\_1/ Other Land includes subdivision parcels of 35 Acres or more and roads.

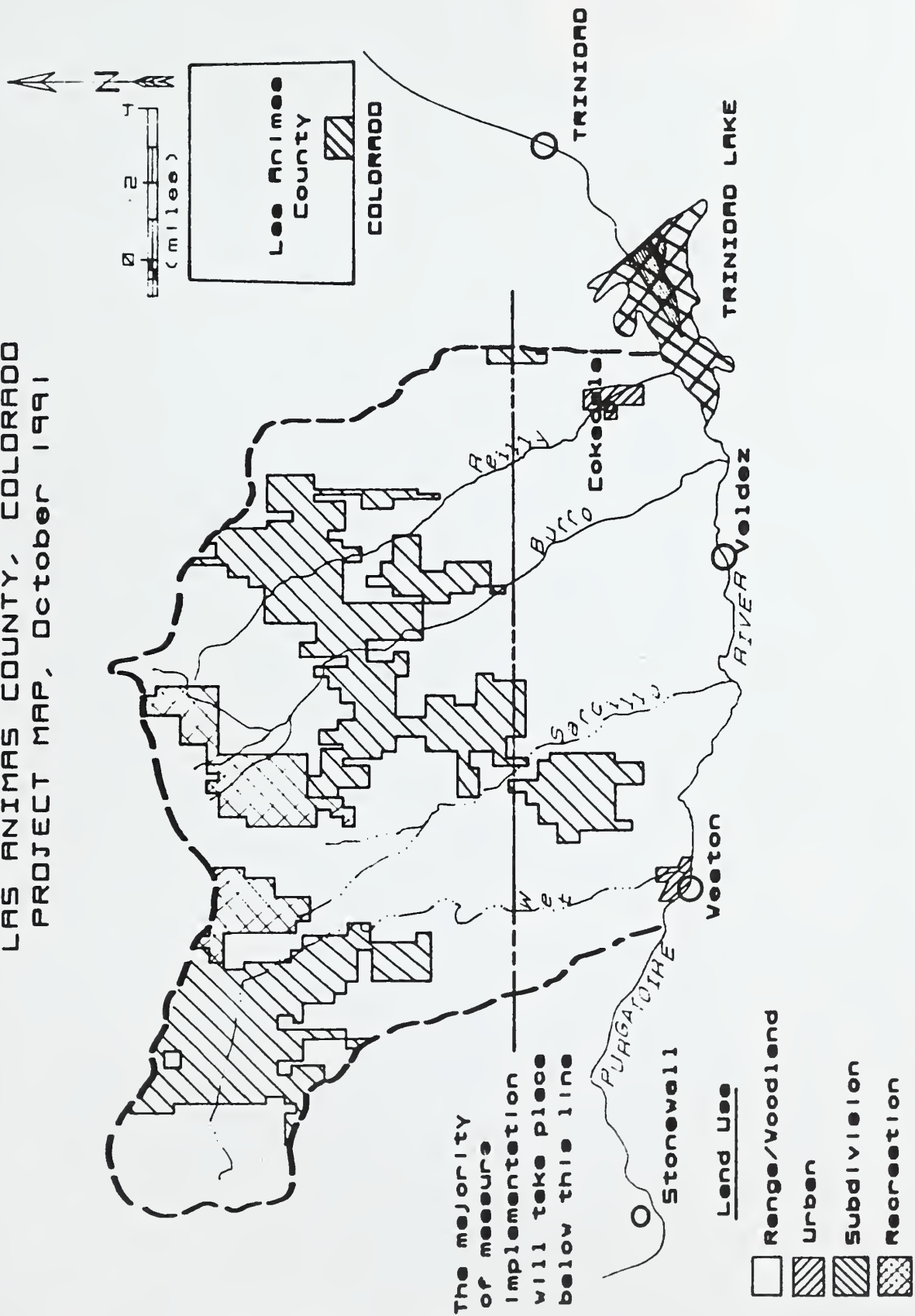


## APPENDIX E





TRINIDAD LAKE NORTH WATERSHED  
LAS ANIMAS COUNTY, COLORADO  
PROJECT MAP, OCTOBER 1991





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